UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
MIAMI DIVISION

CASE NO. 1:24-cv-24253

DWAYNE WILSON, TYRONE HARRIS,
and GARY WHEELER, individually
and on behalf of those similarly situated,

Plaintiffs,

vs.

RICKY DIXON, in his official capacity
as Secretary of the Department of Corrections,
FRANCISCO ACOSTA, in his official capacity
as Warden of Dade Correctional Institution, and
FLORIDA DEPARTMENT OF CORRECTIONS,
an agency of the State of Florida,

Defendants.

Second Declaration of Stefano Schiavon, Ph.D.

I, Stefano Schiavon, declare as follows:

I. Introduction

A. Background, Qualifications, and Experience

1. I am a Professor of Architecture and a Professor of Civil and Environmental Engineering at the University of California, Berkeley (hereafter "UC Berkeley") in Berkeley, California. I joined UC Berkeley as a member of the faculty in 2011. A list of my work experience, training, and publications is contained in my curriculum vitae, attached hereto as **Exhibit A.**

2. Before my appointment at UC Berkeley, I was a Postdoctoral Scholar and Assistant Professional Researcher at UC Berkeley, where my research focused on Heating,

Ventilation and Air Conditioning ("HVAC") systems for commercial buildings. I received my Master of Science in Mechanical Engineering and my PhD in Energy Engineering from the University of Padua in Italy.

3. My teaching covers a wide range of topics, including fundamental principles of energy flows in buildings, thermal properties of building materials, thermal comfort, solar geometry, passive solar design, passive cooling, daylighting, indoor air quality, acoustics, renewable applied to buildings, and mechanical and electrical lighting. I teach graduate seminars on Heating, Ventilation, and Air Conditioning ("HVAC"), research methods, building energy and performance simulations, and indoor environmental quality measurement and modeling.

4. My research focuses on finding ways to reduce energy consumption in buildings while improving occupant health, well-being, and performance. We spend most of our time inside buildings, whose environments substantially affect our health, well-being, and job/learning performance. My research focuses on sustainable building design; building energy efficiency; indoor environment quality; well-being; thermal comfort; indoor air quality; mechanical systems; lighting, post occupancy evaluation; energy simulation; building standards and codes; heat; and window view quality.

5. I am the Associate Director of the Center for Environmental Design Research (CEDR) and the Associate Director for Research of the Center for the Built Environment (cbe.berkeley.edu), which is one of the CEDR research centers. The Center for the Built Environment is a National Science Foundation Industry/University Cooperative Research Center. Its mission is to improve the design and operation of buildings to assure high performance and quality for their occupants and owners. It is a research collaboration between

UC Berkeley and its contributing Industry Partners. CBE currently has ~50 Industry Partners representing architecture and engineering firms, building owners, facility managers, manufacturers, utilities, and government agencies. CBE's primary work emphasizes evaluating and improving the environmental quality of buildings, testing new technologies for increasing occupant well-being, and reducing the energy used by buildings and their environmental control systems. In addition to the significant research programs developed under CBE's umbrella, it is also a forum for information exchange in a cooperative environment. CBE's activities include research, building evaluation and benchmarking studies, standards participation, publishing a newsletter and website for technology transfer, and semi-annual meetings with 120-150 people attending. I am one of the three active faculty in the center; I lead the research enterprise.

6. I have published 122 peer-reviewed scientific articles in international journals, 94 peer-reviewed papers or extended abstracts in conference proceedings, 2 editorials and 3 book chapters. I serve on the editorial boards of *Energy and Building* and *Building and Environment*, two of the top-tier journals in the architectural, engineering, and construction industry. Many of these papers relate to thermal comfort, indoor air quality, and HVAC systems. I have a Google citation rate of 14076 and an h-index of 59, placing me among the top ranked faculty in the field of architectural engineering, thermal comfort and heat globally. Among my papers, there are contributions on developing new thermal comfort models, assessing accuracy of the most commonly used metric for thermal comfort indoor, a literature review for assessing indoor environmental quality (noise, light, thermal and acoustics), a model to predict the clothing insulations, several assessment of thermal environment and indoor air quality in hot and humid climates, the estimation of humidity-dependent temperature thresholds during heatwaves, modeling the effect of solar radiation on people, the physiological effect of

heat exposure, the assessment of passive and low-energy strategies to improve sleep thermal comfort during heat waves and cold snaps and personal exposure to heat. I am one of the top global top experts on the effect of air movement generated by fans.

7. I have led the development of software designed to estimate thermal comfort, heat stress and perform climate analysis. The CBE Thermal Comfort Tool is a free online tool for thermal comfort calculations and visualizations that implements thermal comfort and heat stress calculations from national and international standards. It incorporates the major thermal models, including the ASHRAE and ISO Predicted Mean Vote (PMV), Standard Effective Temperature (SET), adaptive models, local discomfort models, dynamic predictive clothing insulation and Predicted Heat Strain. The CBE Thermal Comfort Tool provides results compliant with ASHRAE 55-2023. It can be freely accessed at comfort.cbe.berkeley.edu. The CBE Clima Tool is a web-based application built to support climate analysis, specifically designed to support the need of architects and engineers interested in climate-adapted design. It allows users to analyze the climate data of more than 27,500 locations worldwide. It furthermore calculates several climate-related values (i.e. solar azimuth and altitude, Universal Thermal Climate Index (UTCI), comfort indices, etc.). It can be freely accessed at clima.cbe.berkeley.edu. I co-authored the Python library *Pythermalcomfort*. It is a comprehensive toolkit for calculating thermal comfort indices, heat/cold stress metrics, and thermophysiological responses based on international standards and peer-reviewed research. Designed for researchers, engineers, and building-science professionals, it simplifies complex calculations while promoting accuracy and standards compliance. It can be freely accessed at https://pypi.org/project/pythermalcomfort/. It includes models for Heat Index, Discomfort Index, Humidex, ASHRAE and ISO Predicted Mean Vote (PMV), Standard Effective

Temperature (SET), Predicted Heat Strain Index, Physiological Equivalent Temperature (PET), Universal Thermal Climate Index (UTCI), and Wet Bulb Globe Temperature Index (WBGT).

8. My work has been featured on media outlets including the Washington Post, the Wall Street Journal, NPR, Time, CNN, Forbes, The Atlantic, USA Today, Newsweek, The Associated Press, The Boston Globe, ArchDaily and Architectural Record.

9. I have won four Best Paper Awards from the leading journal *Building and Environment*, the 2017 Faculty Award for Excellence in Postdoctoral Mentoring from the Berkeley Postdoctoral Association, and the Ralph G. Nevins Physiology and Human Environment Award 2013 from the American Society of Heating, Refrigeration and Air Conditioning Engineers ("ASHRAE"). I also won the 2010 Young Scientist Award from the European Federation of Heating Ventilation and Air Conditioning Associations ("REHVA") for outstanding research work by a researcher under 35 years of age.

10. I was a Technical Advisory Group (TAG) member for the World Health Organization (Department of Environment, Climate Change, and Health), the World Meteorological Organization, and the Global Heat Health Information Network on "Informing decision-making about indoor heat risks to human health." This work contributed to the update of the WHO fact sheet for heat and health published in May 2024 (https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health).

11. I am a member of the "Extreme Heat Work Group" of the International Code Council (ICC) to develop a maximum temperature limit for all building types covered by ICC. The ICC model codes have a large influence on the building sector in the US because they provide standardized, comprehensive, and up-to-date guidelines for building safety, sustainability, and performance.

12. Because my research focuses on design and assessing real-life built environment, it necessarily intersects with the rules and regulations governing building construction. My work requires deep knowledge of standards for heating, ventilation, and air conditioning inside buildings, as well as other aspects of environmental health in buildings. For more than a decade, I have extensively studied, used, and/or worked to improve a wide range of building standards. Indeed, a meaningful portion of my professional work is dedicated to improving building standards to reflect modern research on indoor environmental quality. I focus my efforts on the professional society ASHRAE. For over a decade, I have been a non-voting member of the technical committee responsible for ASHRAE Standard 55, which specifies conditions for acceptable thermal environments. I was a founding member and a voting member of the ASHRAE committee developing ASHRAE Standard 216, which specifies testing methods for determining application data for overhead circulator fans (i.e., ceiling fans).

13. Many substantial changes to ASHRAE Standard 55 have been made based on my group research results and the amendments I helped to develop. For example, I led the development and implementation of a dynamic clothing insulation model. The model predicts clothing insulation levels based on outdoor temperature levels (an input to thermal comfort modeling). This model has now been implemented in the standard.

14. I was retained by Plaintiffs' counsel to provide expert opinions on how to evaluate the heat index and air quality at Dade Correctional Institution (Dade CI). I have been retained at an hourly rate of $445 an hour for general consulting, site visit, record review, and report/declaration drafting, $320 per hour for travel time, and $530 per hour for deposition, hearing, or trial testimony. My compensation is not dependent in any way on the outcome of

this matter or on the substance of my findings and conclusions. The matters set forth are my independent opinions, based on my personal and professional knowledge. If called as a witness to testify, I could and would testify competently.

15. The opinions contained in this declaration are based on my training, professional experience, and familiarity with the literature on the subjects of heat, indoor thermal conditions, building performance simulation, indoor environmental quality assessment, the effect of outdoor thermal environment indoor, indoor air quality and human response to the thermal environment.

16. In the past four years, I have served as an expert witness writing a report and by deposition in one case: *National Fire Protection Association, Inc. v. UpCodes Inc., Scott Reynolds and Garrett Reynolds*, Case No. 2:21-cv-05262-SPG-E. I have not served as an expert witness in any trial or court hearing.

B. Materials Reviewed

17. For purposes of this declaration, I have reviewed the following:

a. Sworn declaration of Timothy Jones;

b. Map from Google Maps of the dormitories at Dade Correctional Institution (Dade CI);

c. Additional images of Dade CI from Google Maps and Google Earth;

d. Chart of the highest daily heat index recorded at Homestead Airforce Base (Homestead AFB) from May-September of 2023;

e. Amended declaration of Timothy Jones;

f. The class action Complaint in this case;

g. Data Files Downloaded from Hobo Devices Installed at Dade CI Dormitories.

Dates of files are June 5, 2025, July 18, 2025, July 28, 2025, September 5, 2025, and October 3, 2025;

h. Hobo device location and file key;

i. Dade CI map with dorm notations (PLS 0003000)

j. Pictures of the locations of the sensors within Dade CI;

k. Data showing outdoor temperatures recorded at Homestead Airforce Base from May 2-August 7 2025;

l. 2025-02-07 FDC Answers to Interrogatories (PLS002059);

m. 2025-05-13 Amended FDC Answers to Interrogatories (PLS002074);

n. 2025-07-18 Department's Amended Rog Response (PLS002095-002099)

o. 2025-07-30 FDC Responses to Tyrone Harris Interrogatories (PLS002100-002111)

p. Air Flow Test Document 2022 (FDC_000010371)

q. 602.060 Seasonal Preparedness Effective 2024 (FDC_000007955)

r. Air Flow Test Documents 2024 (FDC_000002329)

s. Upper Level Floor Plan (FDC_000020414)

t. Exhaust/Ventilation Work Order List - 2020-2025 (FDC_000010383)

u. Maps, diagrams, and plans of Dade CI dormitories (FDC_000391810 – 000391834)

v. Rothfusz, Lans P. 1990. The Heat Index "Equation". SR 90-23. NWS Southern Region Headquarters, Fort Worth, TX.

w. Blazejczyk, Krzysztof, Yoram Epstein, Gerd Jendritzky, Henning Staiger, and Birger Tinz. 2012. "Comparison of UTCI to Selected Thermal Indices."

International Journal of Biometeorology 56 (3): 515–35. https://doi.org/10.1007/s00484-011-0453-2.

x. Meade, Robert D., Ashley P. Akerman, Sean R. Notley, Nathalie V. Kirby, Ronald J. Sigal, and Glen P. Kenny. 2024. "Effects of Daylong Exposure to Indoor Overheating on Thermal and Cardiovascular Strain in Older Adults: A Randomized Crossover Trial." Environmental Health Perspectives 132 (2): 027003. https://doi.org/10.1289/EHP13159.

y. Tartarini, Federico, and Stefano Schiavon. 2020. "Pythermalcomfort: A Python Package for Thermal Comfort Research." SoftwareX 12 (July): 100578. https://doi.org/10.1016/j.softx.2020.100578.

z. Tartarini, Federico, Stefano Schiavon, Ollie Jay, Edward Arens, and Charlie Huizenga. 2021. "Application of Gagge's Energy Balance Model to Determine Humidity-Dependent Temperature Thresholds for Healthy Adults Using Electric Fans during Heatwaves." Building and Environment 207 (October): 108437. https://doi.org/10.1016/j.buildenv.2021.108437.

18. On April 22, 2025, I conducted a site visit at Dade CI. During this visit, I walked through and viewed each wing of the following prisoner dorms: A, B, C, D, E, F, G, H. Dorms A through E are open-bay dorms, meaning the prisoners sleep in bunkbeds in one large room. Dorms A through E have two wings each. Dorms F, G, and H are two-story units that have rows of two-person cells with metal doors. Dorms F, G, and H have three wings each. In total, I visited 19 wings and I was able to view and feel the effects of the exhaust systems, ceiling fans, and caged fans within each.

19. The ceiling fans were small, approximately 48-60 inch in diameter, so not

sufficient to cover the needed large area. Because they are undersized, they do not produce enough air movement to provide homogenous coverage and effectiveness. The caged fans were around 30 inch, and located closer to people, but they do not blow any air into the individual cells within F, G, and H dorms. The exhaust systems appeared to be functioning at varying capacities. In some dorms, I could feel them drawing out some air. In other dorms, I could barely feel the exhaust system working at all.

20. In this report, I will refer to Dorms and Wings with a letter followed by a number. For example, “H-2” would be H Dorm, Wing 2. In some cases, I will spell them out fully.

21. All my opinions and conclusions are rendered to a reasonable degree of scientific certainty. I reserve the right to supplement this declaration and to refine my opinion, or develop additional opinions, based on additional information that may become available to me.

C. Summary of My Opinions

22. As I predicted in my previous Declaration, the data collected during the summer of 2025 confirm that many factors affect the heat index within the dormitories at Dade CI.

23. The data conclusively demonstrate that the prisoner dormitories at Dade CI were persistently hot throughout the monitoring period (I analyzed data from May 23 to October 3, 2025). Across all locations, the heat index exceeded the 88°F threshold 97% of the time. In some locations, the heat index exceeded the 88°F threshold 100% of the time. Even in the least-hot location, the heat index exceeded that threshold 87% of the time.

24. The 88°F threshold was chosen in consultation with Dr. Susi Vassallo, who

asserts that the risk to human health increases dramatically at that threshold.[1] I have also provided thresholds in 5°F increments above 88°F to demonstrate the spread of the heat index data at Dade CI.

25. The median heat index across all monitored locations was 98.3°F. The maximum heat index was 119.4°F.

26. The peak indexes usually occurred at night in Dorms F, G and H, between 9:00 p.m. and midnight. They usually occurred in the early afternoons in Dorms A, B, C, D and E.

27. During the three-day period in which heat index was monitored in individual cells within F, G, and H dorms, the heat index in all three cells exceeded the 93°F threshold 100% of the time. In the cell within F Dorm, the heat index exceeded the 98°F threshold 100% of the time, and it exceeded the 103°F threshold 50% of the time.

28. In all dorms, the heat index remained above the 88°F threshold for many consecutive hours and days. In F-1, for example, the heat index did not drop below 88°F for 2,888 consecutive hours (more than 120 days).

29. There were also long periods of time when the heat index exceeded 108°F. For example, in H-2, there was a period in July when the heat index did not drop below 108°F for 34 consecutive hours.

30. At every location, it was usually hotter inside the prison than it was outside. This was particularly true in Dorms F, G, and H. In H-2, for example, the heat index inside the dorm exceeded the heat index outside 93.1% of the time. Overall, across all wings of all dorms, the

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[1] Other researchers have proposed lower thresholds at which the heat poses danger to human health. A 2024 study from a prominent thermal physiologist research group lead by prof. Glen Kenny concluded that 26°C (79°F) was the "indoor temperature upper limit" for protecting vulnerable occupants from overheating. In their experiment the relative humidity was 45% and the relative heat index was equal to ~26°C (~79°F). *See* Meade, Robert D., Ashley P. Akerman, Sean R. Notley, Nathalie V. Kirby, Ronald J. Sigal, and Glen P. Kenny. 2024. "Effects of Daylong Exposure to Indoor Overheating on Thermal and Cardiovascular Strain in Older Adults: A Randomized Crossover Trial." Environmental Health Perspectives 132 (2): 027003. https://doi.org/10.1289/EHP13159.

indoor heat index exceeded the outdoor heat index 79.6% of the time.

31. The existing mechanical systems at Dade CI are unable to lower the heat index to levels consistently below 88°F.

II. ANALYSIS: THE HEAT INDEX AT DADE CI

32. Heat stress is a major health concern in indoor environments. The heat index is a metric that combines air temperature and humidity. It is used to estimate human heat stress.

33. While useful, the heat index has several important limitations. First, the heat index is based on the assumption that people are exposed to air movement equal to 5 knots (~2.5 m/s).[2] This is not the case in the cells of dorms F, G and H. I was unable to perform air speed measurements, but based on my professional judgement, I doubt that the average air speed at which inmates are consistently exposed is equal to 2.5 m/s even in areas that use fans. In such locations, prisoners will be exposed to higher heat stress than suggested by the heat index. Second, the heat index is an instantaneous measure and does not account for cumulative heat exposure. Scientific evidence suggests that prolonged heat exposure over several days can have negative health effects.

A. General Observations of Dade CI

34. Dade CI is located at a latitude of ~25°N of the equator. It is classified according to the Köppen–Geiger climate zone as Aw, meaning tropical wet and dry. It is close to zone Am (tropical monsoon). July and August are usually the hottest months. In that climate, even a well-ventilated building would not be able to create comfortable conditions during the summer months.

[2] Rothfusz, Lans P. “The Heat Index ‘Equation’ (or, More Than You Ever Wanted to Know About Heat Index).” NWS Southern Region Headquarters, Fort Worth, TX, July 1, 1990.

35. Based on Google Map and Google Earth images and my own observations at Dade CI, there are no large trees, windows shading devices, or other large structures that would shield the dormitories from the sun's radiation. Moreover, according to the drawings I review, it appears that there is no insulation on the walls. Thus, the dormitories will absorb the sun's radiation through the walls and roof throughout the day. This solar radiation will raise the air temperatures (and therefore heat index) within the dormitories. Solar radiation heats indoor surfaces, raising their temperatures above the air. Neither our measurements nor the heat index fully capture this radiant load. When surface temperatures exceed the air temperature, inmates experience greater heat stress than the heat index indicates.

36. Apart from solar radiation, outside temperature, and humidity, the indoor heat index is further increased by the internal heat gains of people, lights, appliances/equipment (TVs, tablets, CPAP machines, Securus kiosk, etc.) and motors.

37. Sensible heat is transferred directly to the dorm through conduction, convection, or radiation. Latent heat is gained when moisture is added to the dorm from humans (breathing and sweating) and from equipment that produce water vapor, like showers. Sensible heat released to the space via convection warms the air instantaneously, while radiant heat is mediated by the thermal mass.

38. People are significant sources of both sensible and latent heat gain. I visited 8 prisoner dorms at Dade CI: A, B, C, D, E, F, G, and H. I understand that Dorms A through E have two wings each with a capacity of approximately 70-80 people per wing (140-160 people per building). Dorms F through H have 3 wings each, with a capacity of 86 people per wing (258 people per building). Such a large number of people amounts to a major heat load, particularly in a small, confined area like the dorms Dade CI.

39. In dorms A through E, a communal bathroom and shower area is adjacent to the part of the dorm where the bunk beds are. There are approximately six showers. In dorms F through H, there are eight one-person shower stalls (four on the first tier and four on the second tier). I noticed that some showers had a sign listing them as cold; I assume that the other showers are hot. The result of this setup is that hot steam from the showers will increase the temperature and humidity within the dorms.

40. There is no air conditioning in the prisoner dormitories at Dade CI. The dormitories have exhaust systems that are designed to draw air in through the windows, and push air out through exhaust vents in the ceiling. No ventilation system of this type would be able to consistently lower the heat index to or below the heat index outside; Only the use of air conditioning could reliably and consistently keep the heat index inside below 88°F.

41. The ventilation systems (both supply and exhaust) at Dade CI are unable to provide heat index below 88°F. During my visit, some of the exhaust fans seemed to be operating at a reduced capacity given that they were not producing noticeable air flow. Moreover, according to the Exhaust/Ventilation Work Order List from 2020-2025 (FDC_000010383), the fans frequently break.

42. In Dorms F, G, and H, I was permitted to enter individual cells, but I was prohibited from bringing my sensors inside. The cells in F and G have windows that are three feet in width and approximately five inches in height (the vented area). The openings are covered by a stainless steel security screen (perforated metal plate) with holes approximately the size of a pencil head. The cells in H Dorm do not have windows. Instead, they have rectangular metal plates, roughly six by eight inches, that are perforated with holes. There is a piece of metal on the outside of most windows, which blocks much of the air that would come

in through the wind and airflow is only based on pressure difference caused by exhaust fans. Overall, the tiny window-like openings in F, G, and H are insufficient to provide sufficient cooling.

43. In Dorms F, G, and H, the exhaust vents are located in the ceilings of the corridors. Given that the window-like openings are in the cells, the flow of air from the windows to the exhaust vents can be impeded by the solid metal doors to each cell. When those doors are closed, additional resistance is created and less air will circulate from the outdoors.

44. In dorms F through H, I entered a cell, closed the door, and spent several minutes inside. I could not test the heat index or CO_2 level, because FDC prohibited me from bringing my equipment inside the cells. I tried to feel the air flow from the window and the vent above the toilet, but the flow was very weak. To confirm the lack of air flow, I wet my finger (to increase sensitivity to air speed) and assessed if I could detect any air movement.

45. Airflow measurements inside the cells of dorms F through H will likely vary depending on whether the cell doors are open or closed, and also on the status of other openings (for example, windows or vents to the outside, or food passes to the corridor).

46. In dorms F through H in particular, I experienced the caustic smell of smoke. This is concerning because I was not able to identify a source of combustion and smoking and burning should not happen indoors.

B. Data

47. I have analyzed data from 31 sensors that were installed throughout the prison. Twenty-four sensors were HOBO MX1101 loggers, which measure temperature and relative humidity. The remaining seven sensors were HOBO MX 1102A loggers, which measure temperature, relative humidity, and CO_2. Both are produced by the USA based Onset (now part

of Li-Cor), a well-known and respected brand in the field with more than 40 years of experience.

48. I am familiar with both types of HOBO loggers. I have worked with them in the past and found them to be accurate and reliable. I have published papers in scientific journals based on data collected from these types of sensors. The MX1101 have a rated temperature measurement range of -4° to 158°F, an accuracy of ±0.38°F from 32° to 122°F and a relative humidity range of 1% to 90% and an accuracy of ±2% from 20% to 80% typical to a maximum of ±4.5%; below 20% and above 80% ±6% typical. The MX1102A have the same temperature and RH performance of MX1101 and a CO_2 range of 0 to 5000 ppm and an accuracy of ±50 ppm ±5% of reading in standard operating conditions. All the sensors were new when installed in the prison.

49. The HOBO loggers recorded indoor environmental conditions at five-minute intervals. From temperature and relative humidity data, the heat index (°F) was calculated and categorized using the *pythermalcomfort* 3.6.1 Python library,[3] which implements the Rothfusz regression formula adopted by the U.S. National Weather Service.[4]

50. I viewed pictures of the locations where the HOBO data sensors were installed throughout the prison. Twenty-eight sensors recorded continuously throughout the summer, from May 23 through October 3, 2025. In Dorms A through E, one sensor was placed in each wing on a central column in the middle of the dorm, roughly 8 feet above the ground. In Dorms F through H, two sensors were installed in each wing. One sensor was placed in the dayroom on the wall to the right upon entering each wing, approximately 8 to 10 feet off the ground—

[3] Tartarini, F., Schiavon, S. (2020), "pythermalcomfort: A Python package for thermal comfort research," SoftwareX 12, 100578, https://doi.org/10.1016/j.softx.2020.100578.

[4] Rothfusz, L.P. (1990) The Heat Index Equation. National Weather Service Technical Attachment (SR 90-23).

this sensor is referred to as "Dayroom." The other sensor was placed roughly in the middle of the first-floor hallway, on the right side of the hall when facing into the dorm, near cell 119, about 7 feet off the ground—this one is referred to as "Hallway." Each sensor was enclosed and locked in a plastic lock box. In my opinion, they were placed in locations that would adequately and accurately capture the heat index within the dorms.

51. For the remaining three sensors, my understanding is that they were placed in Cell 1214 of F-1, Cell 2222 of G-2, and Cell 3222 of H-3. They remained in those cells for approximately 72 hours, from approximately 12:30 pm on July 18 through approximately 3:00pm on July 21. My understanding is that the doors on these cells were operated in the same manner as the rest of the doors on the wing; that is, they were open when other cell doors were open and closed when other cell doors were closed.

52. Each device is identified by a unique label, logger number, device number, and a description of the device's precise location within the buildings. A log of each sensor and the corresponding location is included in the Appendix to this report.

C. Results

i. Data from Sensors in the Dormitories

53. As noted above, a total of 28 sensors were installed in the dormitories from May 23 through October 3. All but one of the sensors functioned properly throughout the monitoring period. Due to a setting error, the sensor in the G-1 Hallway only recorded data from June 5 through October 3.

54. Heat stress conditions were aggregated and summarized by location across the study period. For each location, I computed the median and maximum of the heat index. I then quantified exceedance frequency at five thresholds (88, 93, 98, 103, and 108°F) by dividing the

number of samples with heat index greater than each threshold by the total number of valid samples at that location, expressed as whole percentages and set to zero where no exceedances occurred. I also calculated the overall median and maximum and the overall percentage of samples above each threshold across all locations, and appended these as a final row labeled "Overall."

Location	Median Heat Index (°F)	Max Heat Index (°F)	Timestamp of Max Heat Index	Percentage of Time Above Specific Thresholds (%)				
				(88°F)	(93°F)	(98°F)	(103°F)	(108°F)
A-1	96.5	111	Aug. 19, 2 PM	95	75	38	10	0
A-2	95.3	109.9	Aug. 19, 2 PM	92	65	32	8	0
B-1	95.1	110.8	Aug. 19, 2 PM	90	64	32	7	0
B-2	96.6	112.5	Aug. 26, 3 PM	95	75	40	12	1
C-1	96.4	114.9	Aug.12, 11 PM	94	72	40	12	1
C-2	97.4	116.9	Aug.13, 12 AM	97	81	45	15	1
D-1	94.4	110.5	Aug. 19, 2 PM	87	59	27	5	0
D-2	95.9	111.6	Aug. 19, 2 PM	94	70	35	9	0
E-1	97.1	110.9	July 22, 3 PM	96	77	43	12	1
E-2	96	112.9	Aug.19, 2 PM	91	68	37	12	0
F-1 Dayroom	101.3	114.3	Aug. 16, 1 AM	99	98	82	33	5
F-1 Hallway	101.2	113	Aug. 16, 12 AM	100	98	83	31	3
F-2 Dayroom	95.6	105.8	July 30 08 PM	98	77	23	2	0
F-2 Hallway	96.7	106.5	July 30, 9 PM	99	87	31	2	0
F-3 Dayroom	96.1	107.5	July 30, 9 PM	98	81	30	3	0
F–3 Hallway	95.2	106.1	July 30, 9 PM	98	77	20	1	0
G-1 Dayroom	100.1	112.8	July 30, 9 PM	99	97	70	23	3
G-1 Hallway	98.4	108.5	July 30, 9 PM	100	94	54	10	0
G-2 Dayroom	100.1	111.6	July 30, 9 PM	99	96	69	23	1
G-2 Hallway	98.3	108.5	July 30, 9 PM	99	94	53	9	0
G-3 Dayroom	99.2	110.3	Aug. 3, 9 PM	99	94	61	17	1

G-3 Hallway	98.3	108.1	Aug. 4, 11 AM	99	94	53	8	0
H-1 Dayroom	100.5	117.4	Aug. 22, 7 PM	99	97	75	24	2
H-1 Hallway	99.7	109.4	July 28, 9 PM	100	97	69	16	0
H-2 Dayroom	102.4	119.4	July 28, 10 PM	100	98	85	44	7
H-2 Hallway	101.9	117.7	July 28, 10 PM	100	99	85	35	3
H-3 Dayroom	99.9	110.7	July 28, 9 PM	99	96	70	18	1
H-3 Hallway	99.6	110.1	July 30, 9 PM	100	97	68	15	0
Overall	**98.3**	**119.4**	**July 28, 10 PM**	**97**	**85**	**52**	**15**	**1**

55. As the Table above indicates, there is sustained, widespread heat stress across the site. The overall median heat index was 98.3°F, with an overall maximum of 119.4°F. Across all locations, the threshold of 88° was surpassed 97% of the time, the threshold of 93°F was surpassed 85% of the time, the threshold of 98°F was exceeded 52% of the time, the threshold of 103°F was exceeded 15% of the time, and the threshold of 108°F was exceeded 1% of the time.

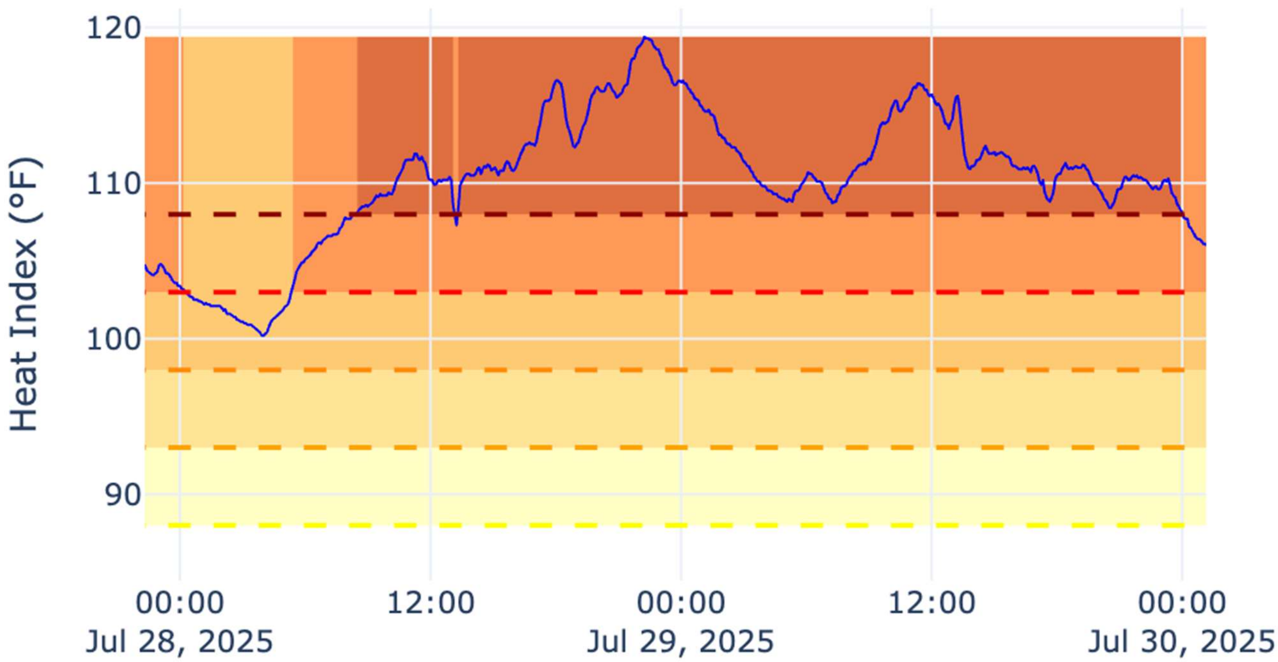
56. Heat burden was highest in Dorms F, G, and H. In the H-2 Dayroom, the median was 102.4°F with a maximum of 119.4°F; 100% of the samples were above 88°F, 85% above 98°F, 44% above 103°F, and 7% above 108°F. The F-1 Dayroom and Hallway showed comparably severe conditions, with medians above 101°F, maximums above 113°F; nearly all samples exceeded 88°F, over 80% exceeded 98°F, and about one-third exceeded 103°F. In Building G, dayrooms and hallways also exhibited intense heat exposure, with medians around 99–100°F and over 95% of samples above 93°F.

57. Buildings A–E also had high heat burdens, with median heat indexes between 94°F and 97°F, and 87–97% of measurements exceeding 88°F.

58. The highest heat indexes were usually recorded late at night, after 9:00 p.m. The

peak heat index—119.4°F—was recorded at 10:00 p.m. in H-2.

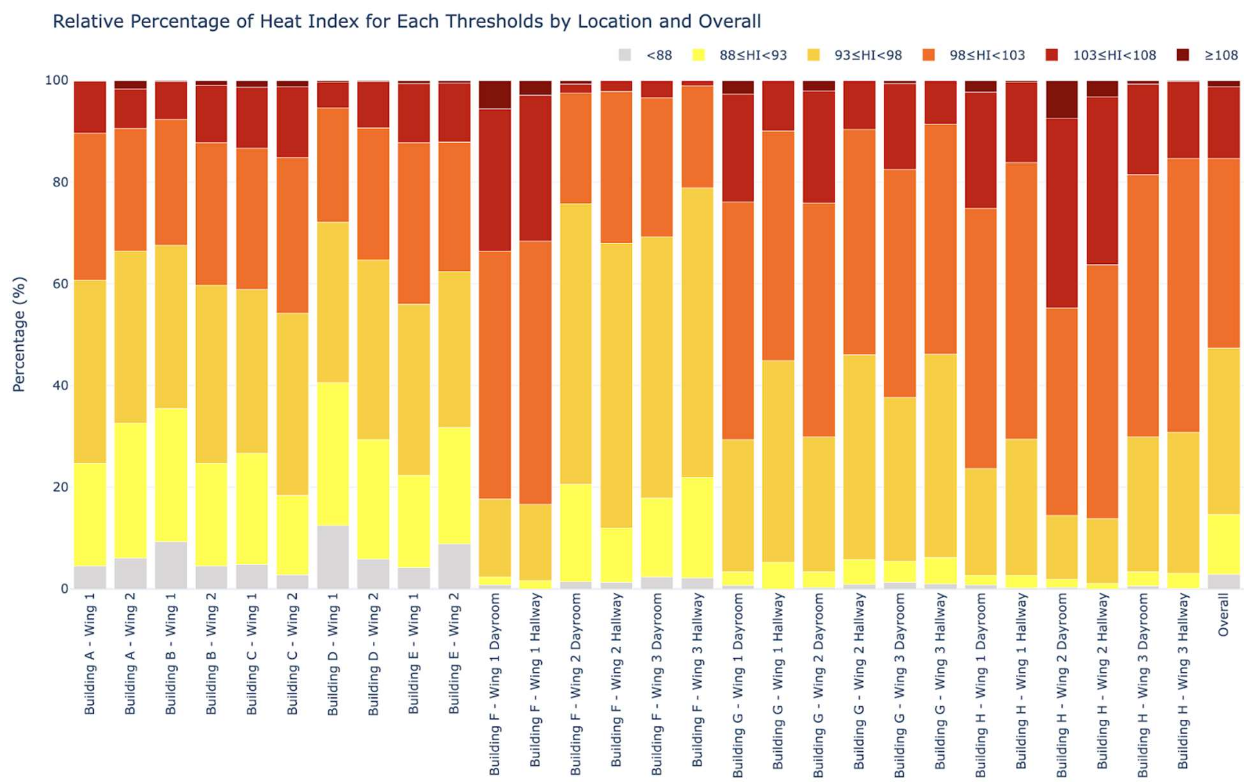
59. In the figure below, I show the conditions in H-2 Dayroom during a 48-hour period from July 28 to July 30, 2025. The colors are based on the thresholds of 88, 93, 98, 103, and 108°F. The heat index stayed above 108°F for 34 hours.



60. As the chart indicates, the peak heat index occurred in the late evening (10 PM). It was frequently the case that the peak heat index in a 24-hour period was recorded late at night, despite the fact that the outdoor heat index usually peaks in the early afternoon. This is primarily because the prison is a high-mass structure that heats up gradually throughout the day. During the daylight hours, it is like a battery that gets charged up by the sun. Even after temperatures cool off outside, the inside of the prison remains extremely hot as the prison building slowly discharges its heat.

61. The data in the graph below show that the heat index classified according to the proposed thresholds. Overall, only 2.8% of the measurements were below 88°F, while 97.2%

of the time the heat index exceeded this threshold. About one-third (33%) of the measurements were between 93°F and 98°F, 37% were between 98°F and 103°F, and 15% were between 103°F and 108°F. Critically, 1.3% of the data exceeded 108°F. Buildings H, F, and G showed the most intense and sustained heat.



62. Again, these results demonstrate pervasive and consistent heat stress across all locations, with highest levels in F, G, and H dorms.

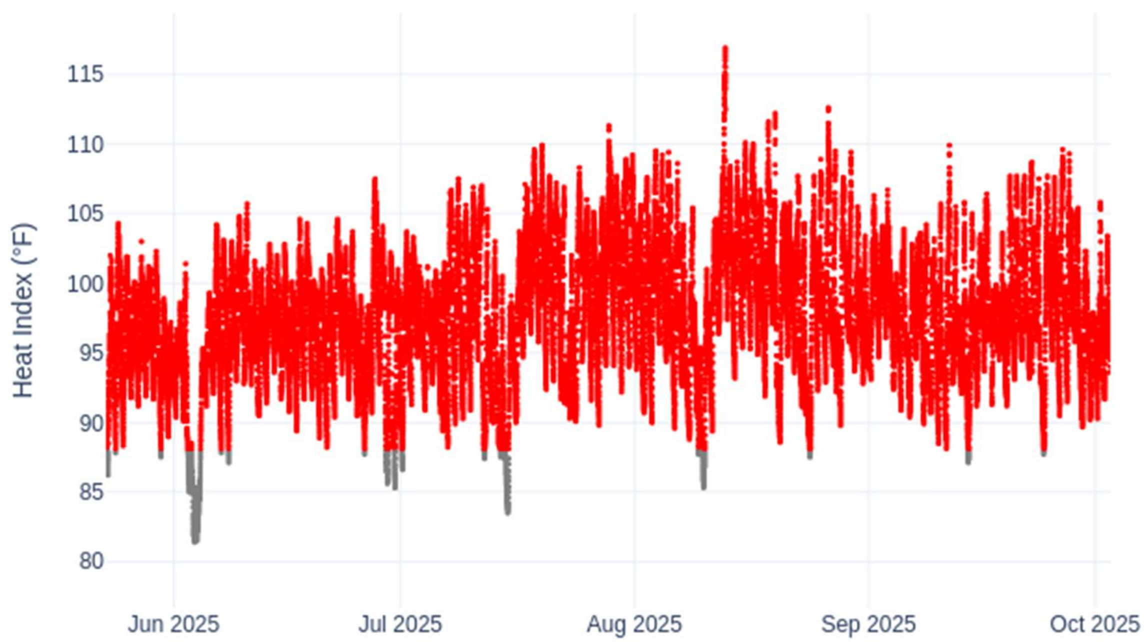
63. I have created time-series charts for every location, showing the heat index in degrees Fahrenheit over the study period. For each location, every five-minute observation is plotted as a point, with values at or below 88°F shown in grey and values above 88°F shown in red.

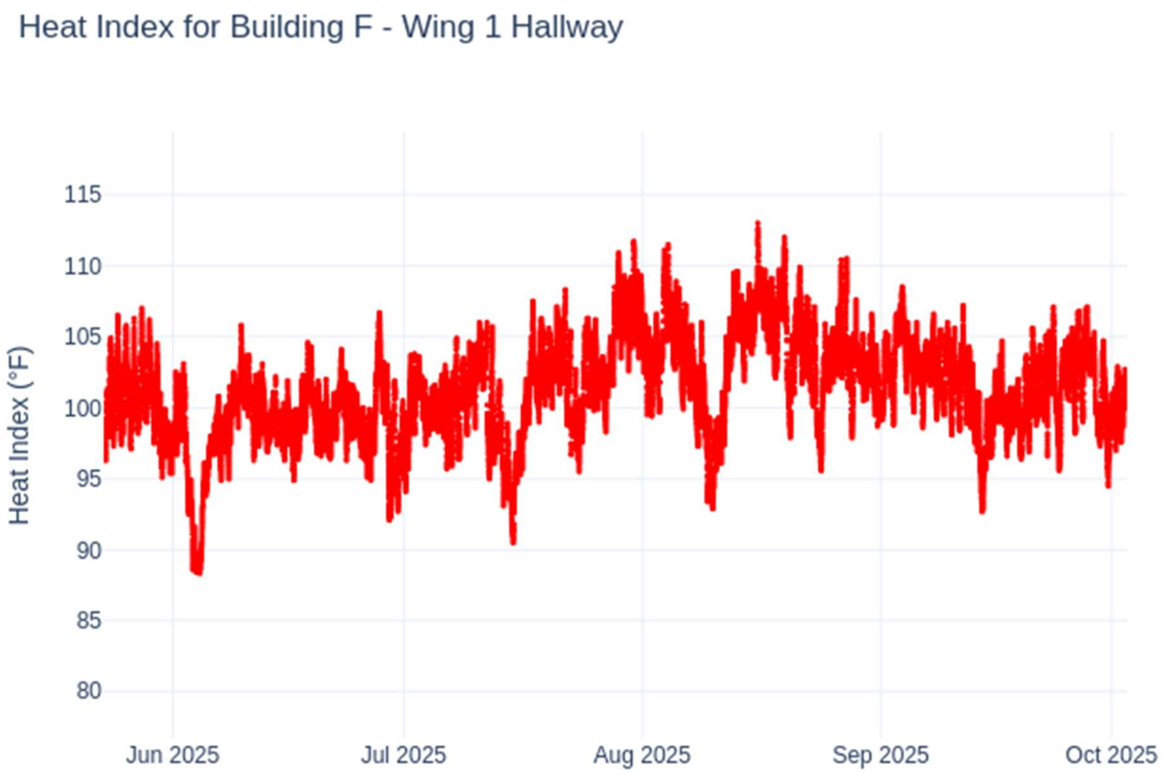
64. All location charts share the same vertical and horizontal scales. The y-axis range is fixed to the global minimum and maximum heat index found in the filtered dataset,

and the x-axis is fixed to the common earliest and latest timestamps. Using uniform axes makes charts directly comparable across locations; differences in the density and duration of red points reflect how often and how long each space exceeded 88°F. Each figure is titled “Heat Index for” and the location. No smoothing or aggregation is applied, so the reader sees the raw temporal variability.

65. The Appendix contains charts for every location. Here, I provide two sample charts: one from C-2, to illustrate the conditions within the “open-bay” Dorm, and the other from F-1, to illustrate the conditions within the dorms with two-man cells.

Heat Index for Building C - Wing 2





66. I have also conducted an analysis to identify and quantify continuous periods when the heat index remained above specified thresholds (88°F, 93°F, 98°F, 103°F, and 108°F). The table below shows the results of this analysis for three locations: F-1 Dayroom, G-1 Dayroom, and H-2 Dayroom. These locations were chosen as exemplars because the raw data suggested that F, G, and H dorms consistently had high heat indexes, even overnight. The duration of every "period above the threshold" was calculated in hours. I reported here the single longest continuous run and reported its start time, end time, and total duration in full hours. This approach allowed for a clear characterization of extreme heat persistence and timing within the monitored period in the selected building.

Location	Consecutive Hours (Approximate Days) Above Specified Thresholds				
	(88°F)	(93°F)	(98°F)	(103°F)	(108°F)
F-1 Dayroom	2888 (120)	837 (35)	357 (15)	93 (4)	16 (1)
G-1 Dayroom	1914 (80)	614 (26)	203 (8)	36 (2)	5
H-2 Dayroom	2894 (121)	833 (35)	209 (9)	47 (2)	34 (1)

67. As the table indicates, there are long stretches of time when the heat index exceeds the specified thresholds. In the H-2 Dayroom, for example, the head index exceeded 88°F for 2894 consecutive hours (121 days). It exceeded 93°F for 833 consecutive hours (35 days), 98°F for 209 consecutive hours (9 days), 103°F for 47 consecutive hours, and 108°F for 34 consecutive hours.

68. Overall, the data show that, throughout the Dade CI dormitories, the heat index exceeded 88°F nearly all summer long.

69. It is also apparent from the data that the exhaust and ventilation systems are unable to keep the heat index below 88°F.

ii. Data from Sensors in the Cells

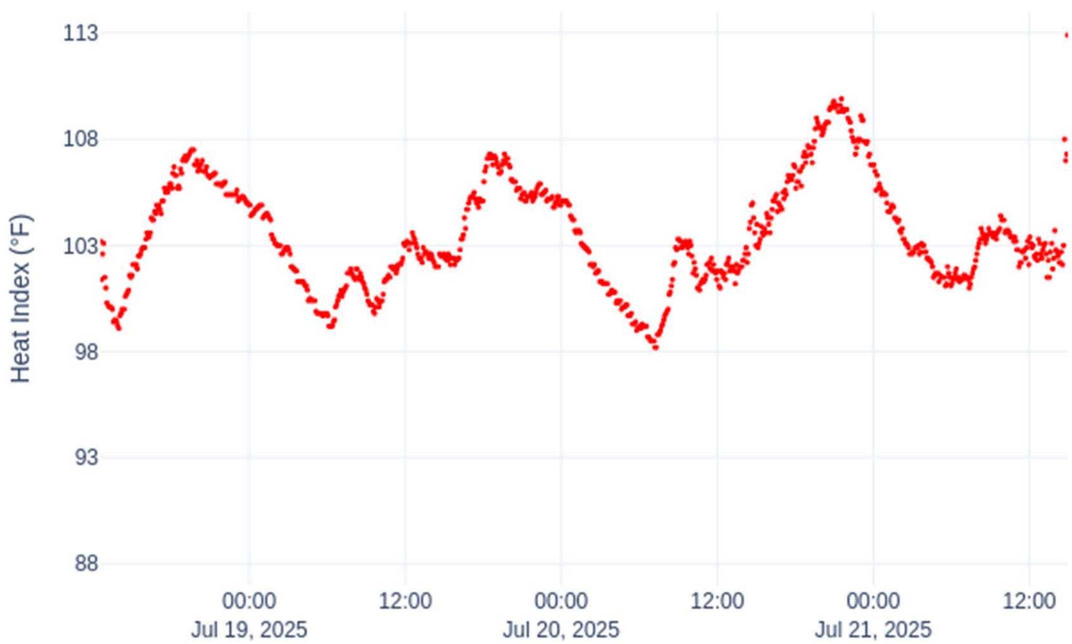
70. As noted above, three sensors were installed inside cells in F, G, and H dorms: Cell 1214 of F-1, Cell 2222 of G-2, and Cell 3222 of H-3. They collected data from 12:30 pm. on July 18, to 3:00 p.m. on July 21.

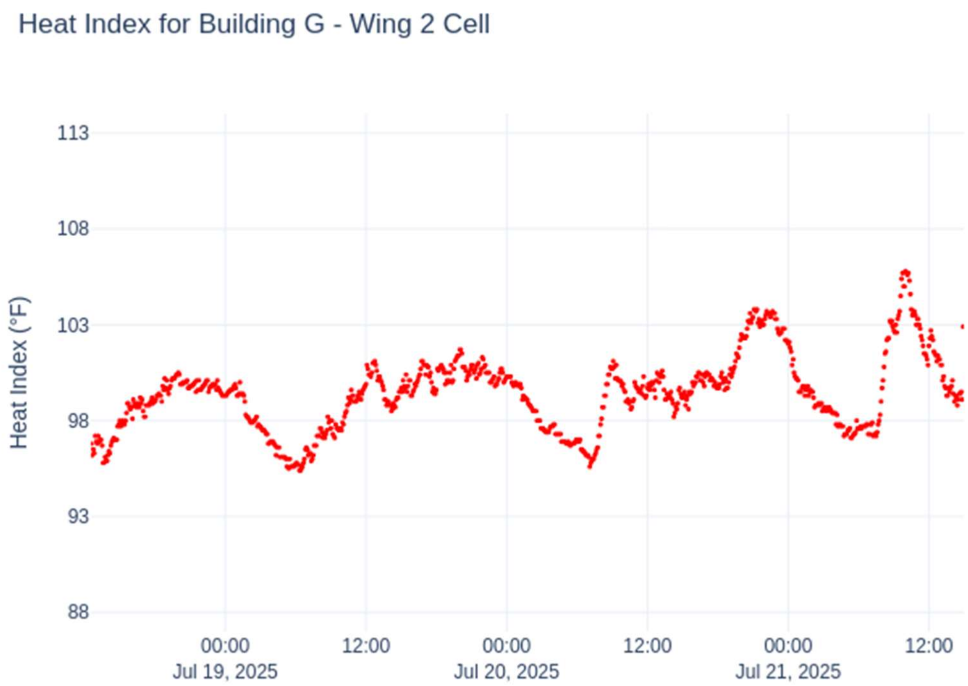
71. The following table lists the median and maximum heat index in each cell, as well as a percentage of the time that the heat index exceeded five thresholds (88, 93, 98, 103, and 108°F). I also calculated the overall median and maximum and the overall percentage of samples above each threshold across all locations combined, and appended these as a final row labeled "Overall."

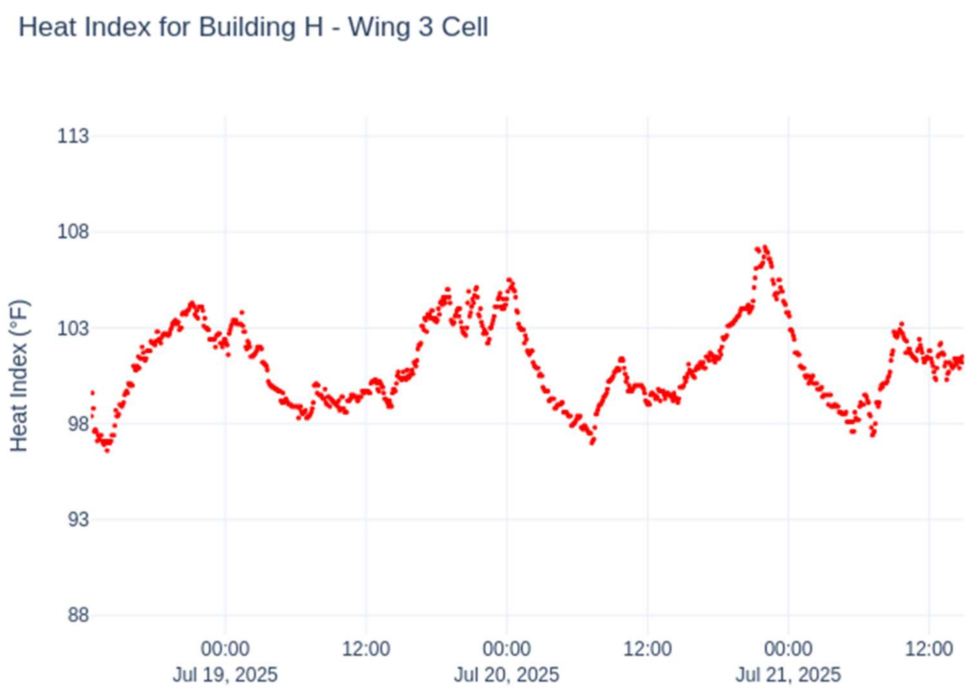
Location	Median Heat Index (°F)	Max Heat Index (°F)	Percentage Above Threshold (88°F) (%)	Percentage Above Threshold (93°F) (%)	Percentage Above Threshold (98°F) (%)	Percentage Above Threshold (103°F) (%)	Percentage Above Threshold (108°F) (%)
F-1 Cell	103	112.9	100	100	100	50	4
G-2 Cell	99.5	105.8	100	100	73	6	0
H-3 Cell	100.9	107.2	100	100	95	22	0
Overall	**100.9**	**112.9**	**100**	**100**	**89**	**26**	**1**

72. Below are time-series charts for each location, showing the heat index in degrees Fahrenheit over the three days for each location. Every five-minute observation is plotted as a point.

Heat Index for Building F - Wing 1 Cell




Heat Index for Building G - Wing 2 Cell
Heat Index (°F)
113
108
103
98
93
88
00:00
Jul 19, 2025
12:00
00:00
Jul 20, 2025
12:00
00:00
Jul 21, 2025
12:00


Heat Index for Building H - Wing 3 Cell
Heat Index (°F)
113
108
103
98
93
88
00:00
Jul 19, 2025
12:00
00:00
Jul 20, 2025
12:00
00:00
Jul 21, 2025
12:00

73. The three cells exhibit persistently elevated heat index across the entire monitoring period. In all three cells, the heat index never dropped below 93°F. The F-1 Cell is the most severe, with a median heat index of 103°F, a maximum of 112.9°F, all samples above 98°F, half above 103°F, and 4% above 108°F. The H-3 Cell is also high burden, with a median of 100.9°F, a peak of 107.2°F, 95% of samples above 98°F, and 22% above 103°F. The G-2 Cell had a median 99.5°F, a peak of 105.8°F, 73% of samples above 98°F, and 6% above 103°F. Overall across the three cells, the median is 100.9°F, the maximum is 112.9°F, 89% of samples surpassed 98°F, and 26% surpassed 103°F.

74. Based on the time series for these cells, the heat index is typically lowest in the early morning around 5–6 am and highest in the evening around 7–9pm. The evening peaks, together with sustained exceedances throughout the day, indicate substantial heat accumulation and no sufficient cooling relief overnight. In H-3, for example, the heat index remained at peak levels well after midnight.

iii. Indoor Data Compared to Outdoor Data

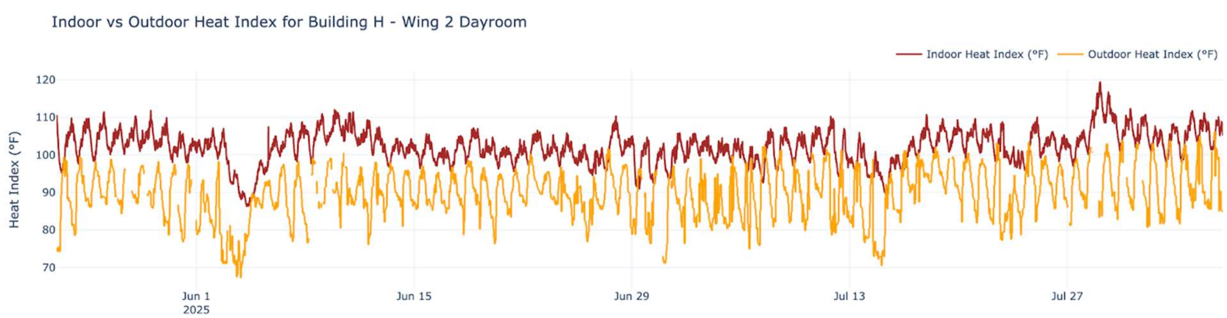
75. I processed hourly outdoor weather data collected from the HOMESTEAD AFB, FL US station (USW00012826) and published by the National Centers for Environmental Information (NCEI).

76. The availability of NCEI weather data has been affected by the federal government shutdown. Prior to the shutdown, weather data was downloaded for the period from May 23, 2025 through August 6, 2025. Data for after August 6 was not available as of this writing.

77. I selected relevant variables including station ID, date, station name, dry-bulb temperature, and relative humidity, then renamed them for clarity. I converted temperature and

humidity into numeric values and expressed temperatures in both Celsius and Fahrenheit. Using the Rothfusz regression mentioned above, I calculated the heat index in Celsius and converted it to Fahrenheit. I rounded the temperature, humidity, and heat index values to one decimal place.

78. I created a visualization comparing indoor and outdoor heat index values for the H-2 Dayroom location over the period from May 23, 2025, to August 6, 2025. The indoor heat index is plotted as a brown line and the outdoor heat index as an orange line.



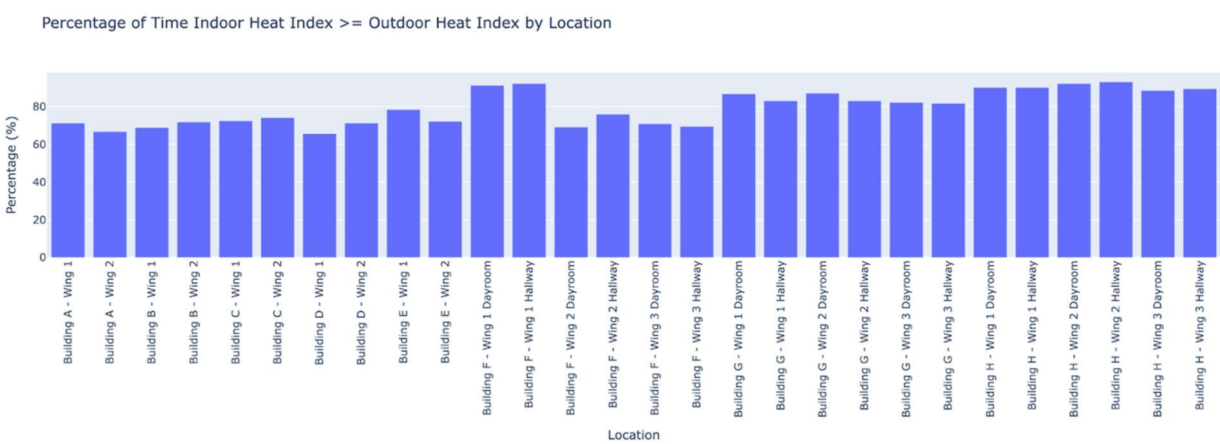
79. As the graph illustrates, the heat index in H-2 exceeded the heat index outside 92.2% of the time. The indoor heat index remains consistently high, typically around 95–110°F, with relatively small fluctuations. In contrast, the outdoor heat index exhibits large daily variations, ranging from below 75°F at night to above 100°F during hot days. Thus, while outdoor conditions fluctuate with daily temperature and humidity cycles, the indoor environment stays at a persistently elevated heat index. The consistently high indoor values indicate limited cooling or ventilation and sustained heat stress risk for occupants, compared to the more variable outdoor conditions.

80. I performed similar analysis for every monitored location at Dade CI. The following table summarizes the percentage of time when the heat index at a particular location exceeded the heat index outside.

Percentage of time when the indoor Heat Index is higher than the outdoor Heat Index by location

Location	Percentage (%)
A-1	71.3
A-2	66.7
B-1	65.9
B-2	71.8
C-1	72.4
C-2	74.1
D-1	65.6
D-2	71.3
E-1	78.4
E-2	72.2
F-1 Dayroom	91.2
F-1 Hallway	92.2
F-2 Dayroom	69.1
F-2 Hallway	75.9
F-3 Dayroom	70.9
F-3 Hallway	69.5
G-1 Dayroom	86.7
G-1 Hallway	83.1
G-2 Dayroom	87.1
G-2 Hallway	83.1
G-3 Dayroom	82.2
G-3 Hallway	81.7
H-1 Dayroom	90.1
H-1 Hallway	90.1
H-2 Dayroom	92.2
H-2 Hallway	93.1
H-3 Dayroom	88.5
H-3 Hallway	89.4

81. The same data in this table are visualized in the following bar chart:



82. For the entire dataset, the overall percentage of time when the indoor heat index is higher than the outdoor heat index is 79.6%. For the period we have outdoor data, the average

indoor heat index is 89.7°F (median=89.8°F) and the average outdoor heat index is 97.8°F (median=98.1°F), confirming the conclusion of the first report: "I expect that the average heat index within the dormitories cannot be lower than the average heat index outside."

83. Indoor heat index generally rises as outdoor heat index rises, but fluctuations in indoor heat index cannot be accurately predicted based on outdoor heat index. In practical terms, indoor conditions are persistently elevated, suggesting limited cooling/ventilation responsiveness and a sustained heat-stress burden indoors.

84. In general, across the prison, the indoor heat index is higher than the outdoor heat index about 80% of the time. This highlights the imperative of measuring heat index conditions inside the dorms rather than relying on outdoor data for policymaking. If outdoor heat index values must be used, a less accurate approach, adding 14°F to the outdoor value would approximate the indoor heat index and capture about 75% of the observed difference between indoor and outdoor conditions. Seasonal Preparedness protocols (FDC_000007955) should take into account indoor conditions.

85. I expect that, from October onwards, the heat index within the prison will generally remain higher than the heat index outside.

86. The only doable, resilient and effective way to lower the heat index to safe levels in this prison is using mechanical cooling, for example, air conditioning, which must be designed, built, commissioned and maintained according to relevant building mechanical codes.

III. CONCLUSION

87. The heat index within the prisoner dormitories at Dade CI was almost always above 88°F in the summer months. In some locations, the heat index did not drop below 98°F for days (or weeks) on end. All of the data demonstrate the heat index levels are dangerously

high.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 26, 2025, in Berkeley, California.

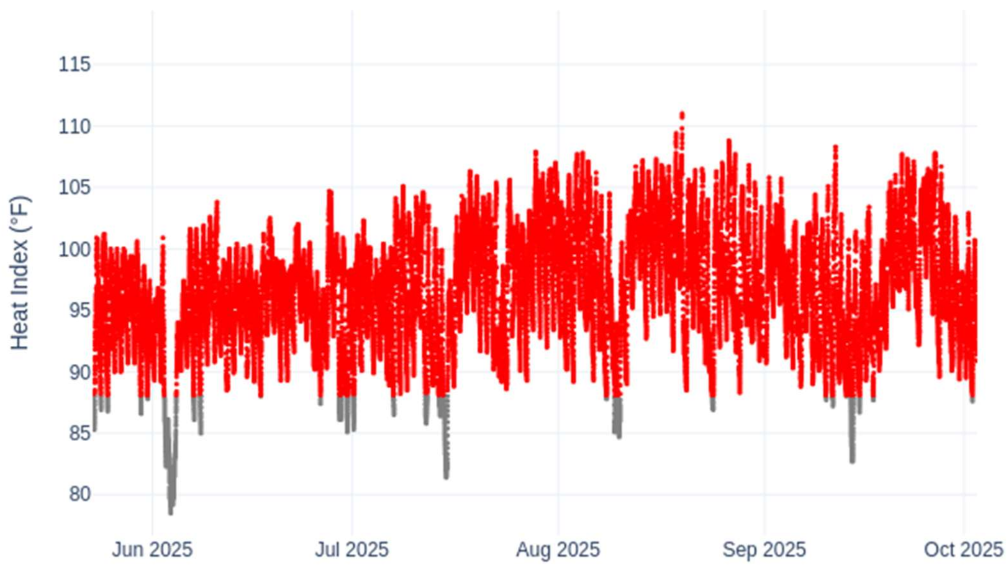
Stefano Schiavon, PhD

APPENDIX

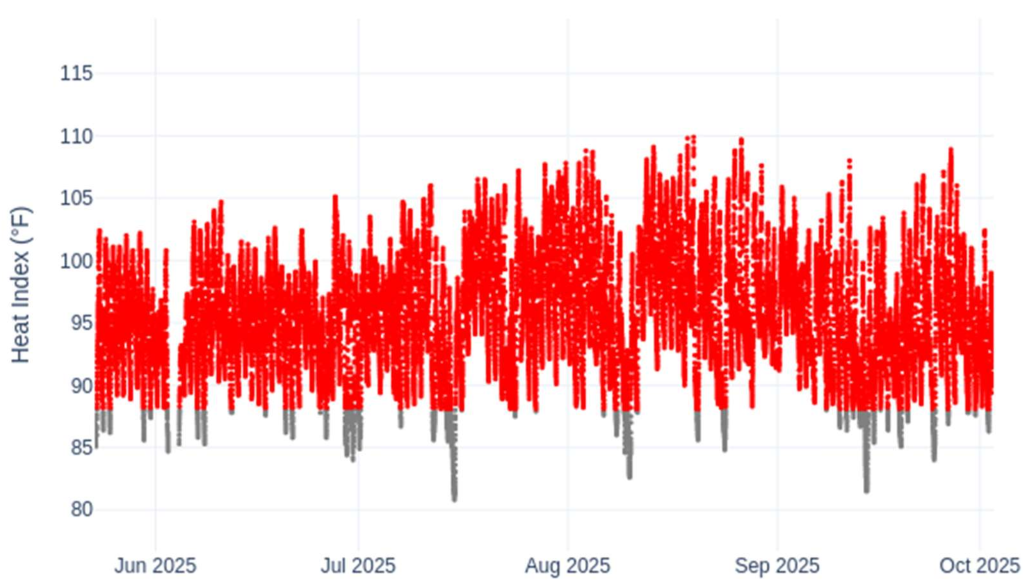
Table 1: Table of Loggers and Locations

Logger Number	Type	Location
22164336	MX1101 - Temp Logger	Building A - Wing 1
22286893	MX1102A - CO2 Logger	Building A - Wing 2
22164337	MX1101 - Temp Logger	Building B - Wing 1
22164338	MX1101 - Temp Logger	Building B - Wing 2
22286894	MX1102A - CO2 Logger	Building C - Wing 1
22164339	MX1101 - Temp Logger	Building C - Wing 2
22164340	MX1101 - Temp Logger	Building D - Wing 1
22164341	MX1101 - Temp Logger	Building D - Wing 2
22164342	MX1101 - Temp Logger	Building E - Wing 1
22164343	MX1101 - Temp Logger	Building E - Wing 2
22164344	MX1101 - Temp Logger	Building F - Wing 1 Dayroom
22164345	MX1101 - Temp Logger	Building F - Wing 1 Hallway
22286895	MX1102A - CO2 Logger	Building F - Wing 2 Dayroom
22164346	MX1101 - Temp Logger	Building F - Wing 2 Hallway
22164347	MX1101 - Temp Logger	Building F - Wing 3 Dayroom
22164348	MX1101 - Temp Logger	Building F - Wing 3 Hallway
22164349	MX1101 - Temp Logger	Building G - Wing 1 Dayroom
22164350	MX1101 - Temp Logger	Building G - Wing 1 Hallway
22286896	MX1102A - CO2 Logger	Building G - Wing 2 Dayroom
22164351	MX1101 - Temp Logger	Building G - Wing 2 Hallway
22164352	MX1101 - Temp Logger	Building G - Wing 3 Dayroom
22164353	MX1101 - Temp Logger	Building G - Wing 3 Hallway
22164354	MX1101 - Temp Logger	Building H - Wing 1 Dayroom
22164356	MX1101 - Temp Logger	Building H - Wing 1 Hallway
22164357	MX1101 - Temp Logger	Building H - Wing 2 Dayroom
22164359	MX1101 - Temp Logger	Building H - Wing 2 Hallway
22286897	MX1102A - CO2 Logger	Building H - Wing 3 Dayroom
22164358	MX1101 - Temp Logger	Building H - Wing 3 Hallway
22185799	MX1101 - Temp Logger	Building F - Wing 1 Cell
22286899	MX1102A - CO2 Logger	Building G - Wing 2 Cell
22286898	MX1102A - CO2 Logger	Building H - Wing 3 Cell

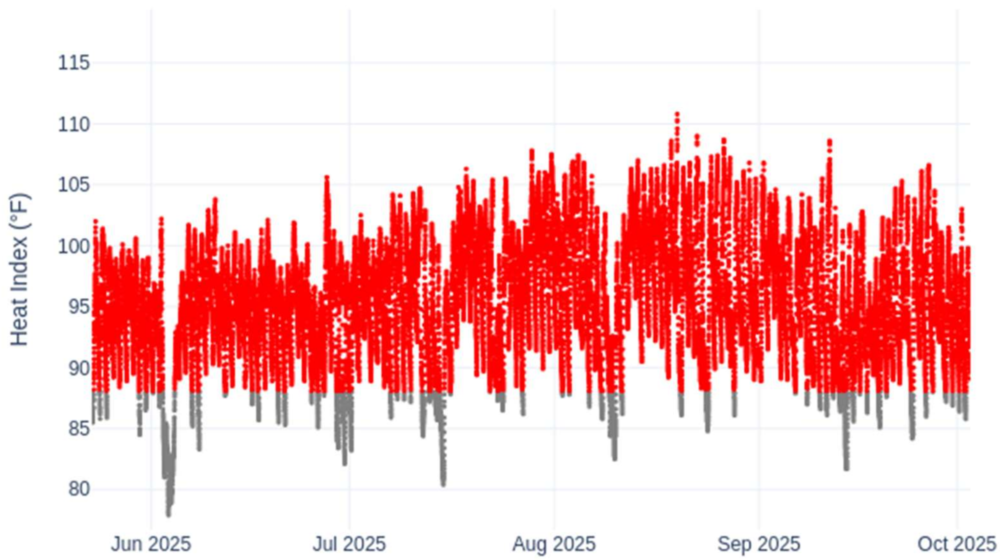
Heat Index for Building A - Wing 1



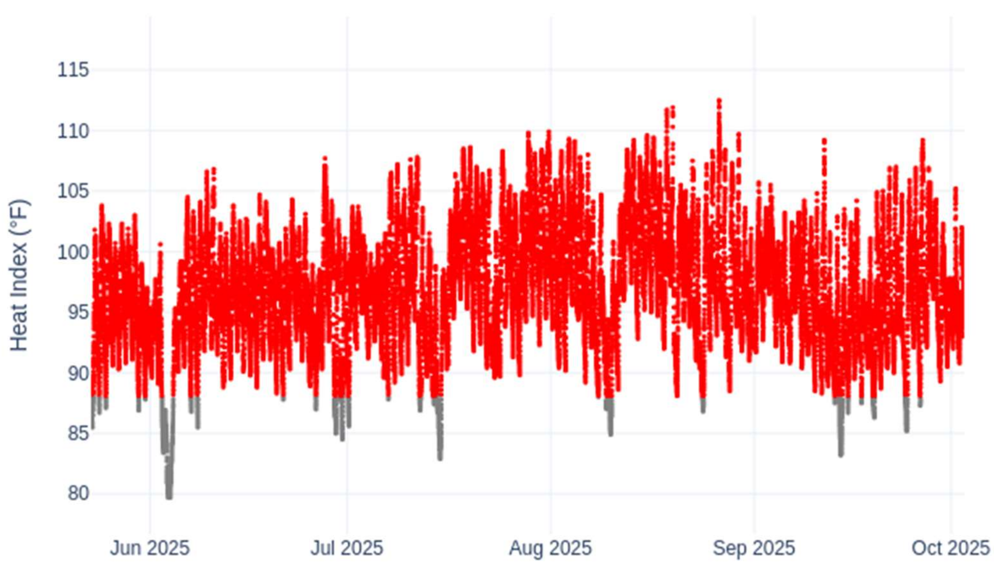
Heat Index for Building A - Wing 2



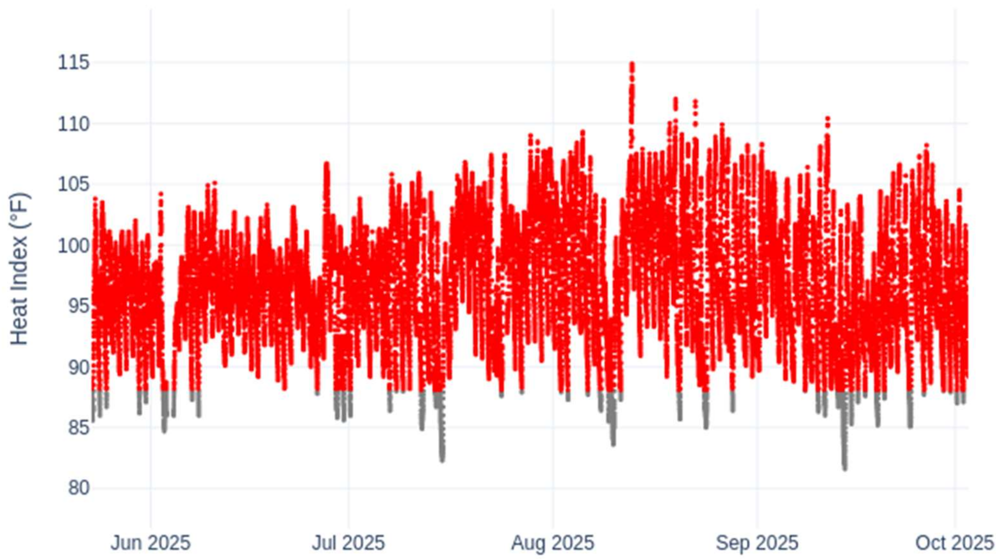
Heat Index for Building B - Wing 1



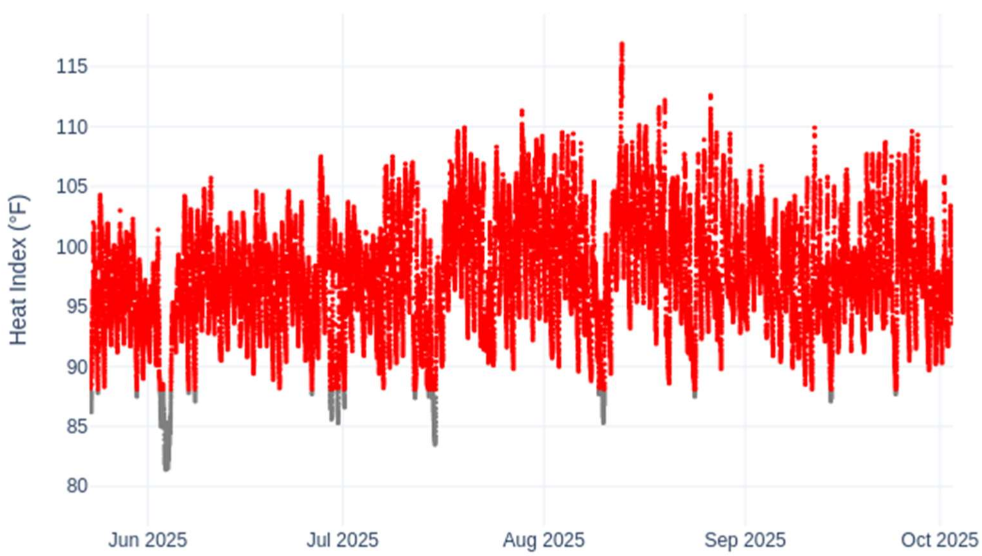
Heat Index for Building B - Wing 2

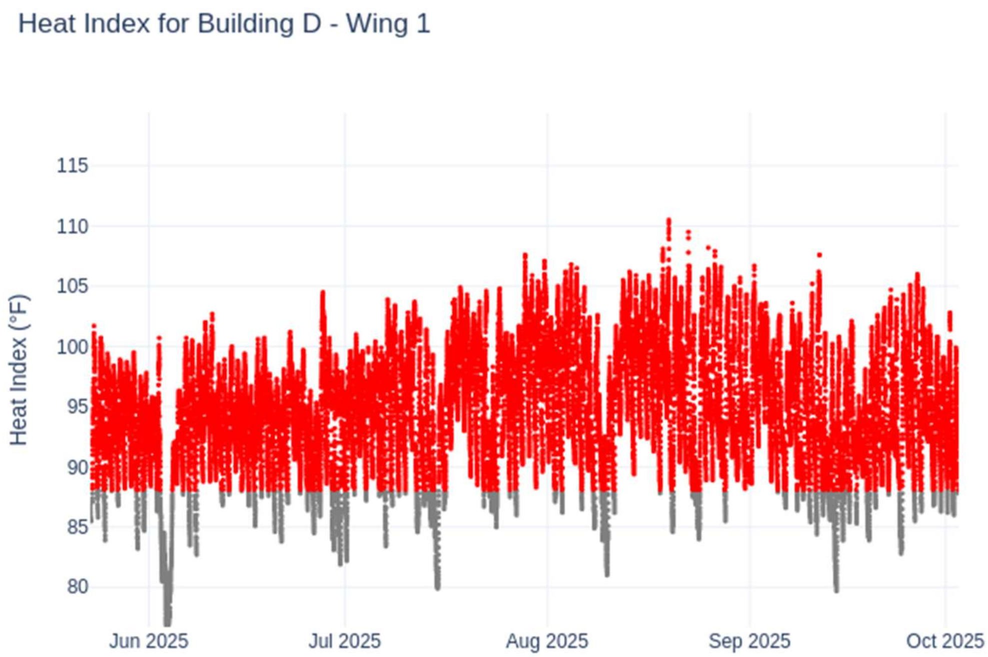


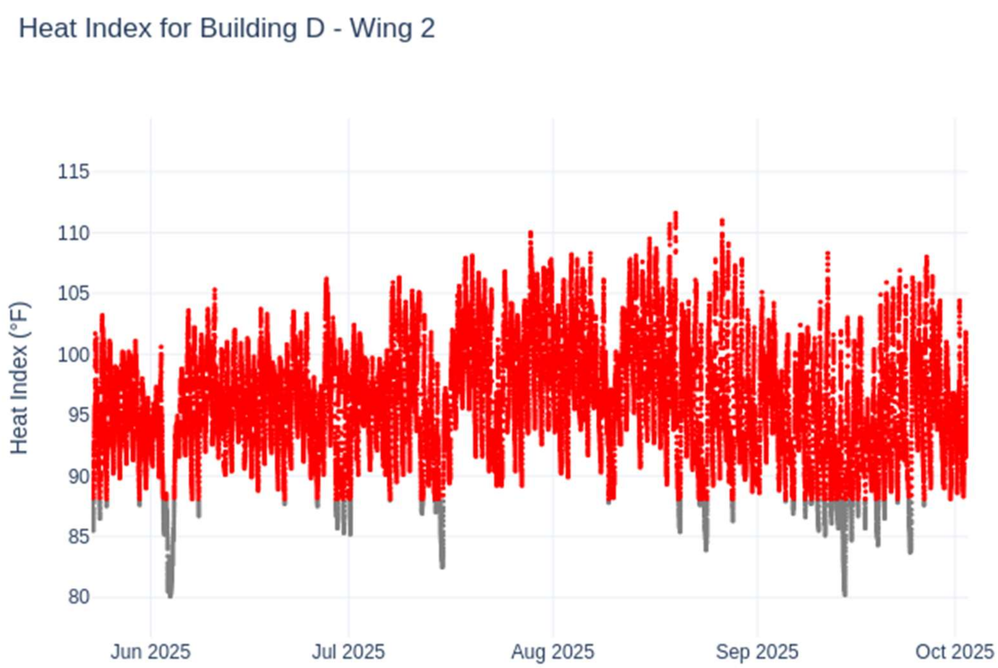
Heat Index for Building C - Wing 1



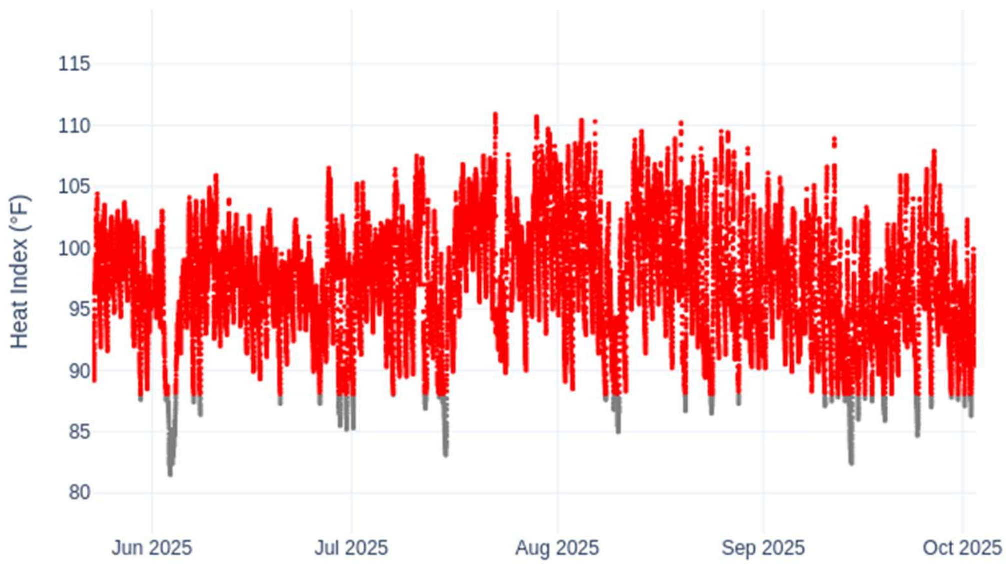
Heat Index for Building C - Wing 2



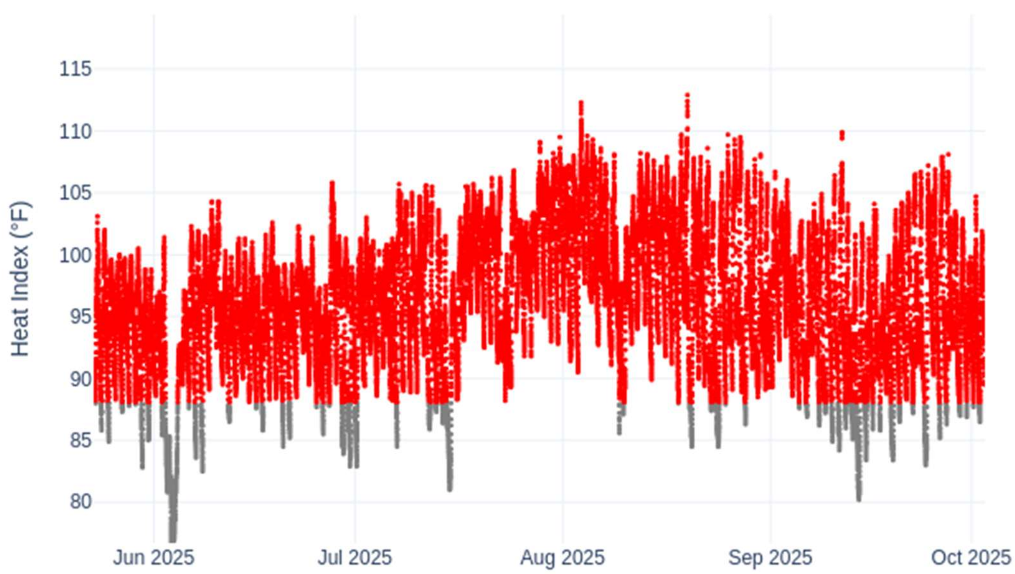

Heat Index for Building D - Wing 1
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building D - Wing 2
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

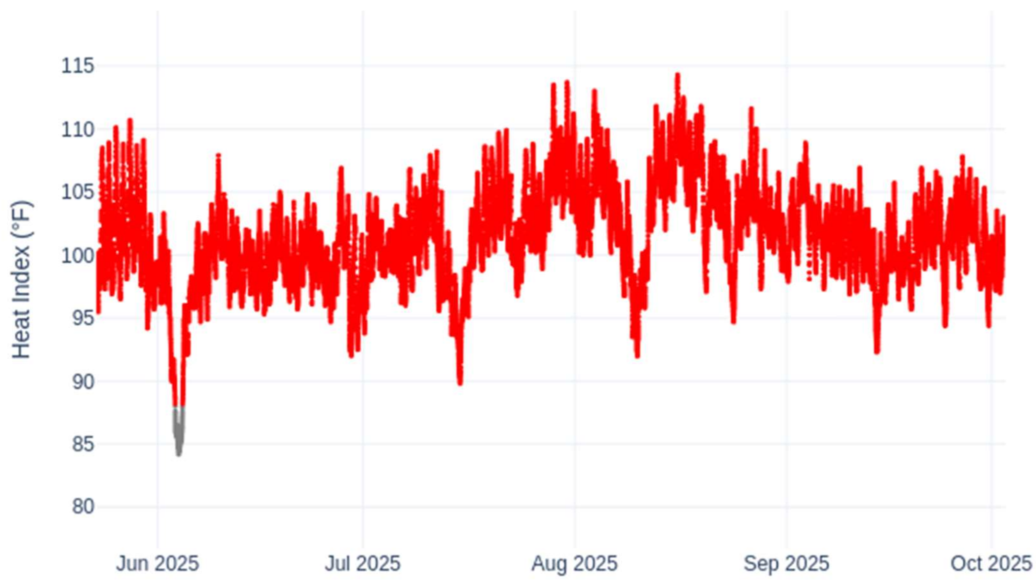
Heat Index for Building E - Wing 1



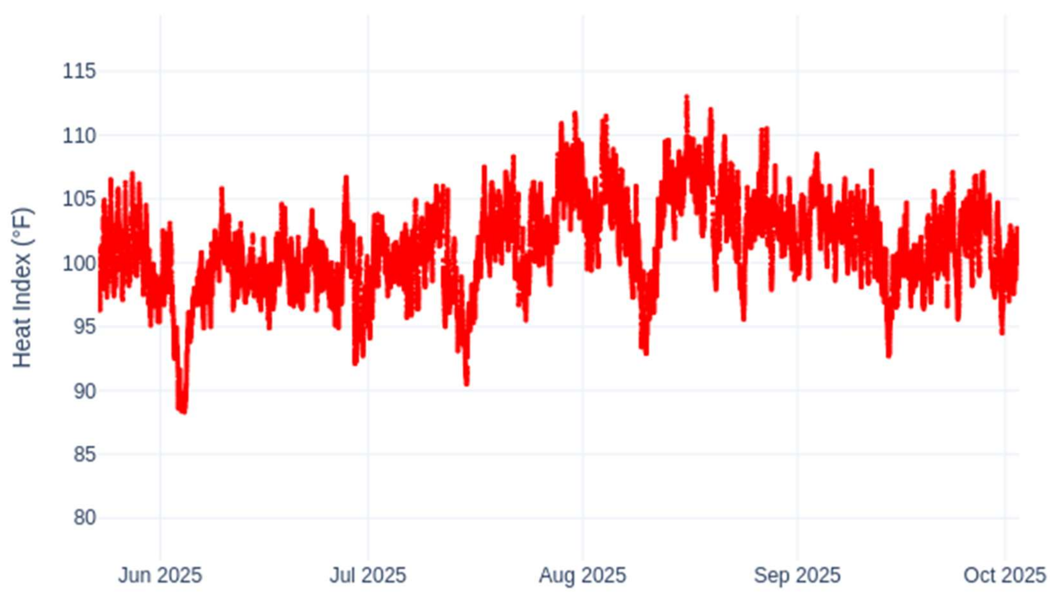
Heat Index for Building E - Wing 2

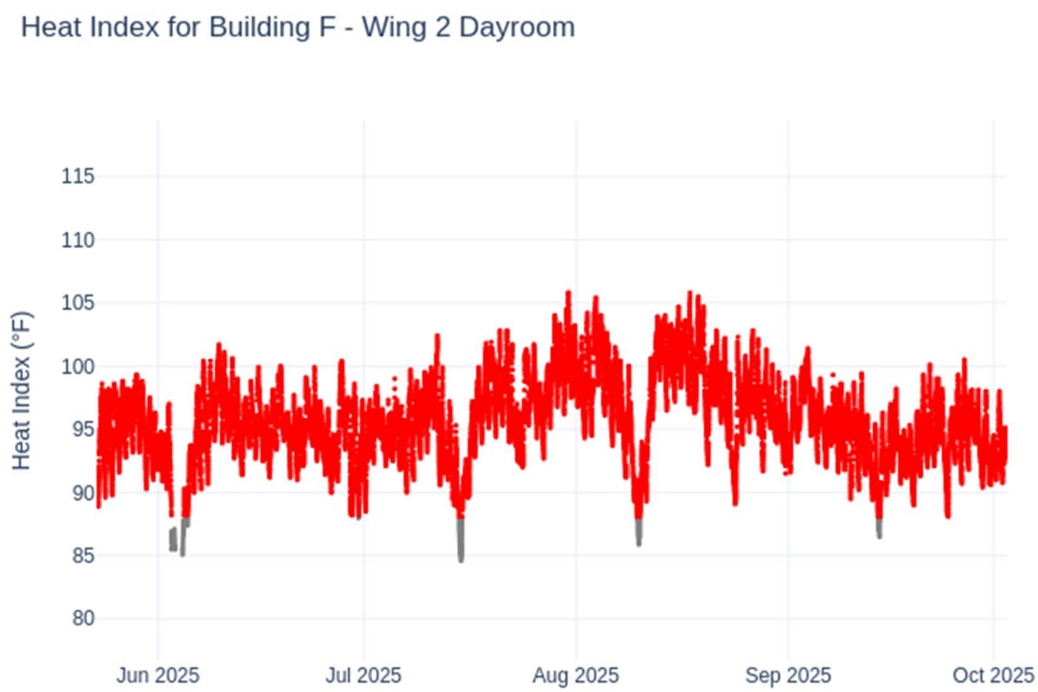


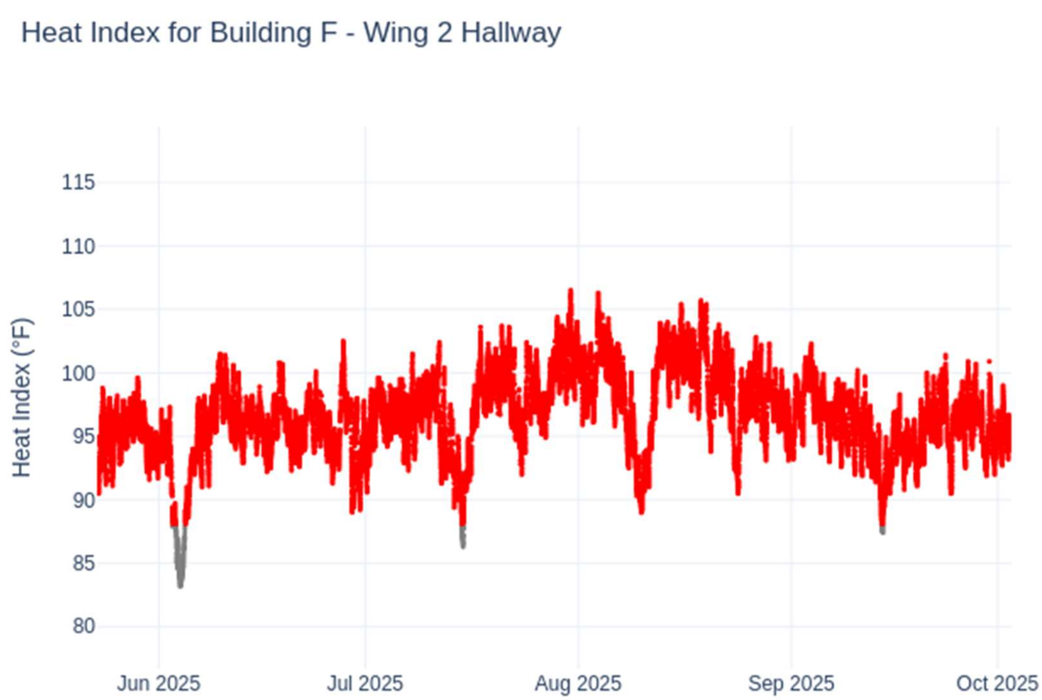
Heat Index for Building F - Wing 1 Dayroom

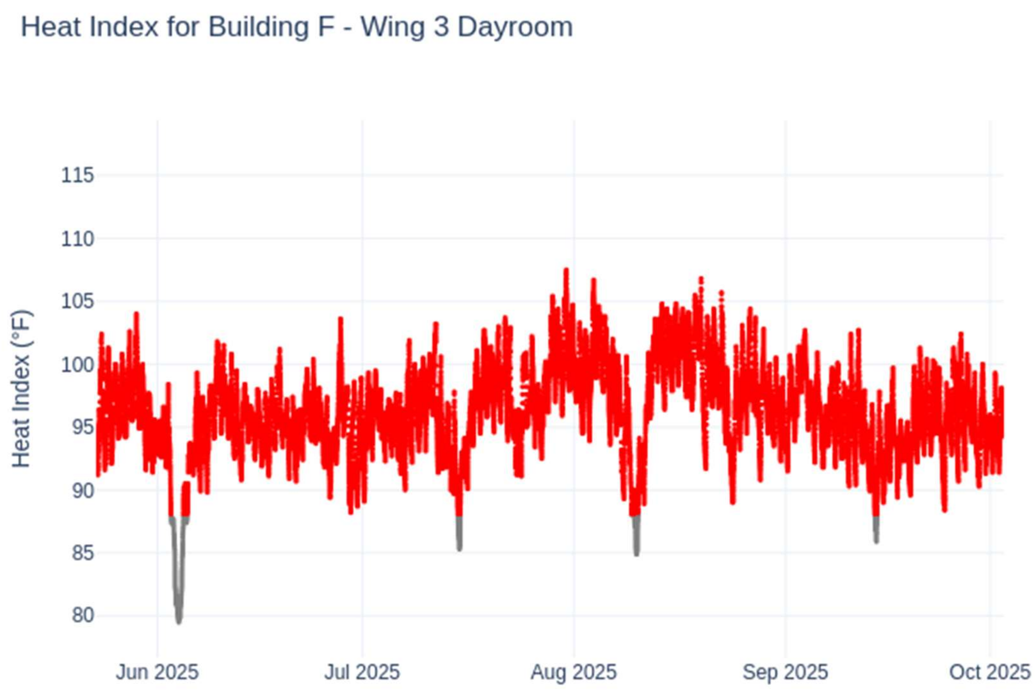


Heat Index for Building F - Wing 1 Hallway

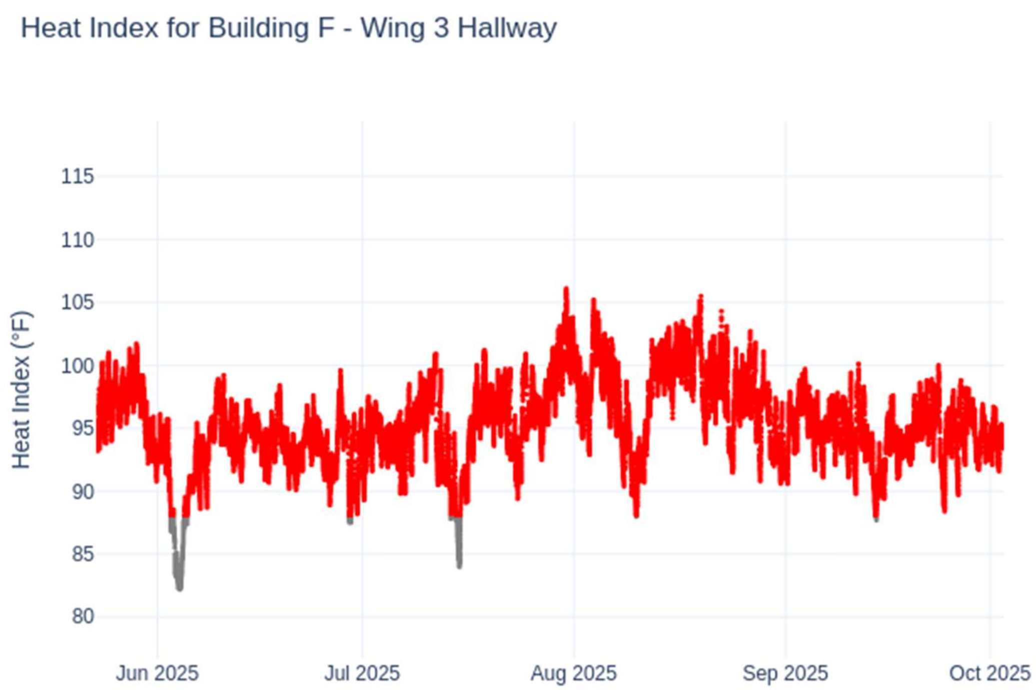



Heat Index for Building F - Wing 2 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

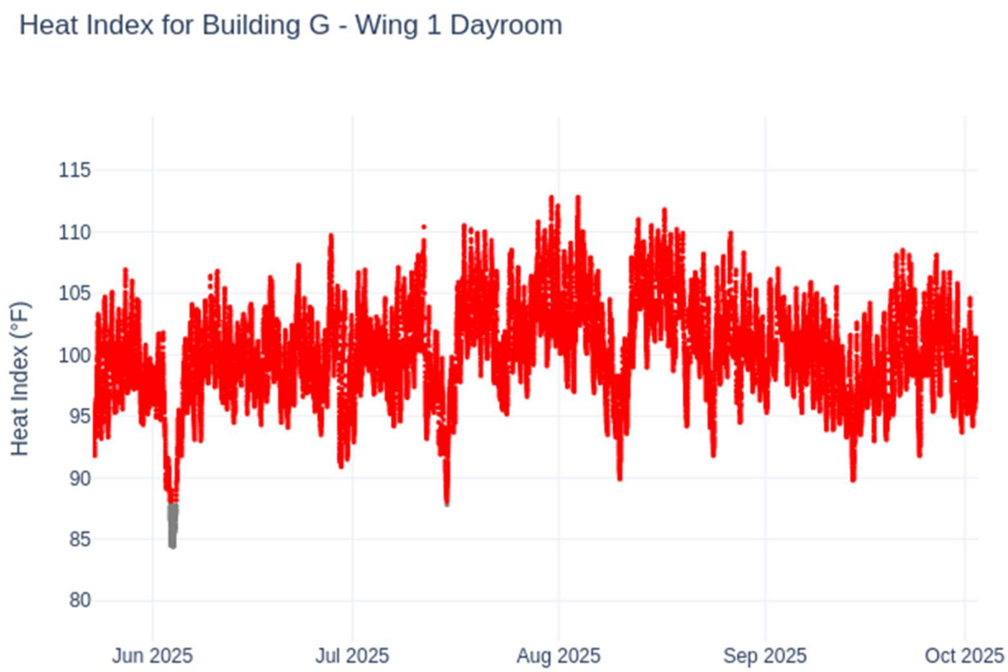

Heat Index for Building F - Wing 2 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

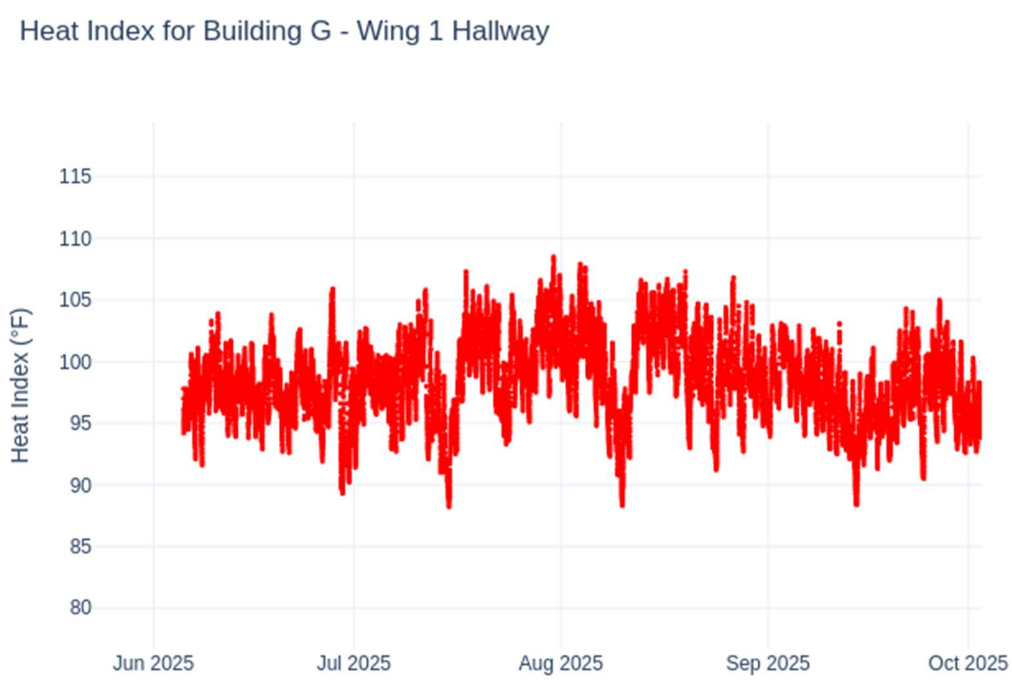


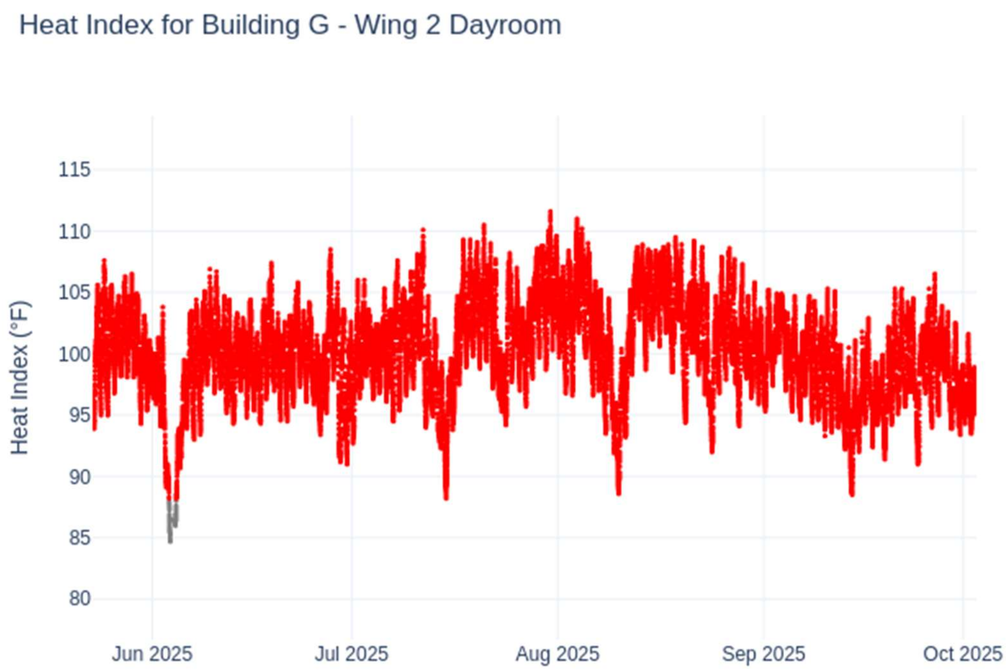
Heat Index for Building F - Wing 3 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

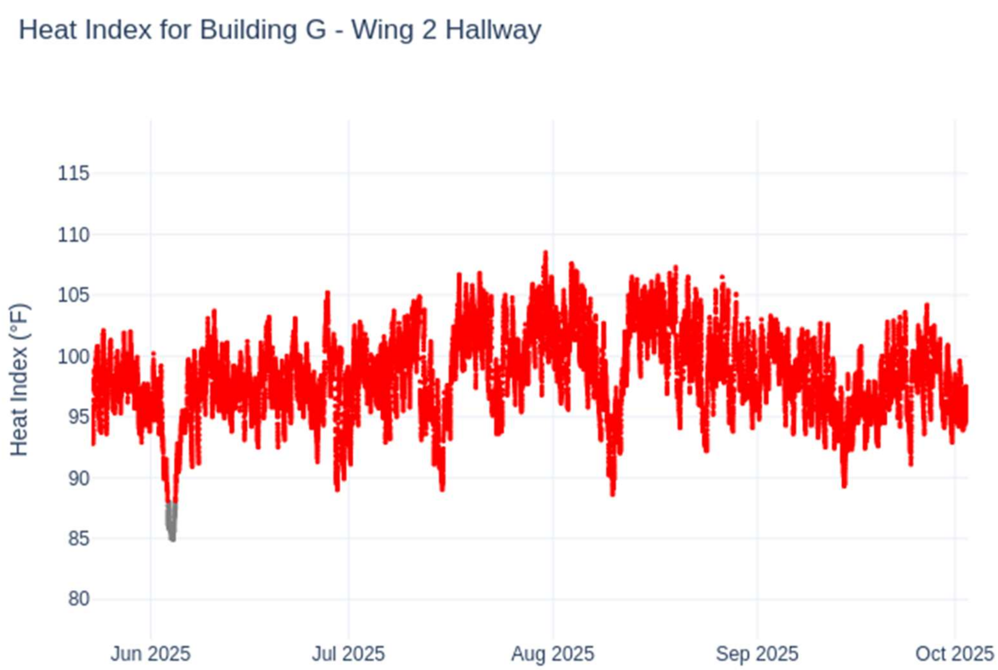


Heat Index for Building F - Wing 3 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

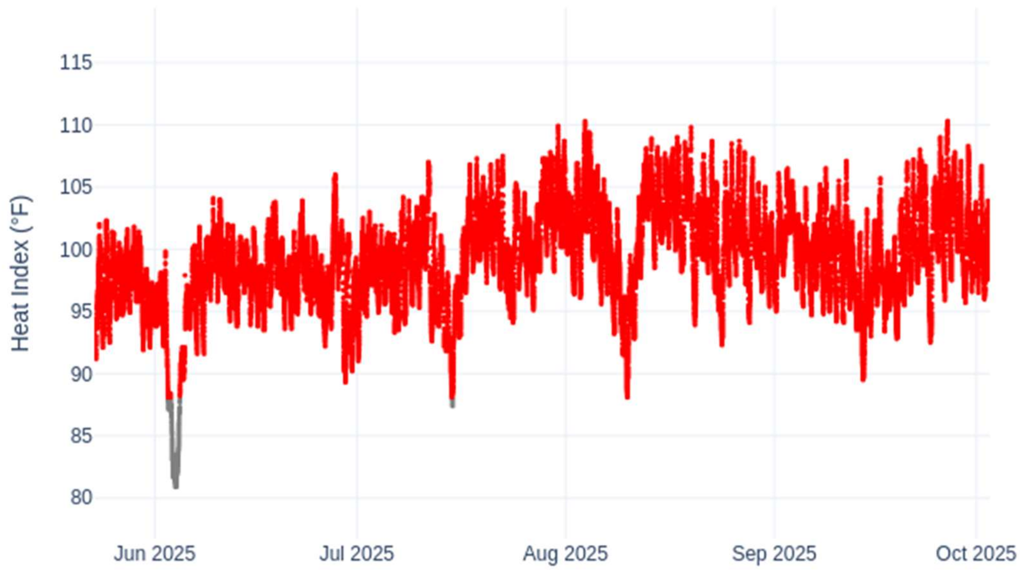

Heat Index for Building G - Wing 1 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building G - Wing 1 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

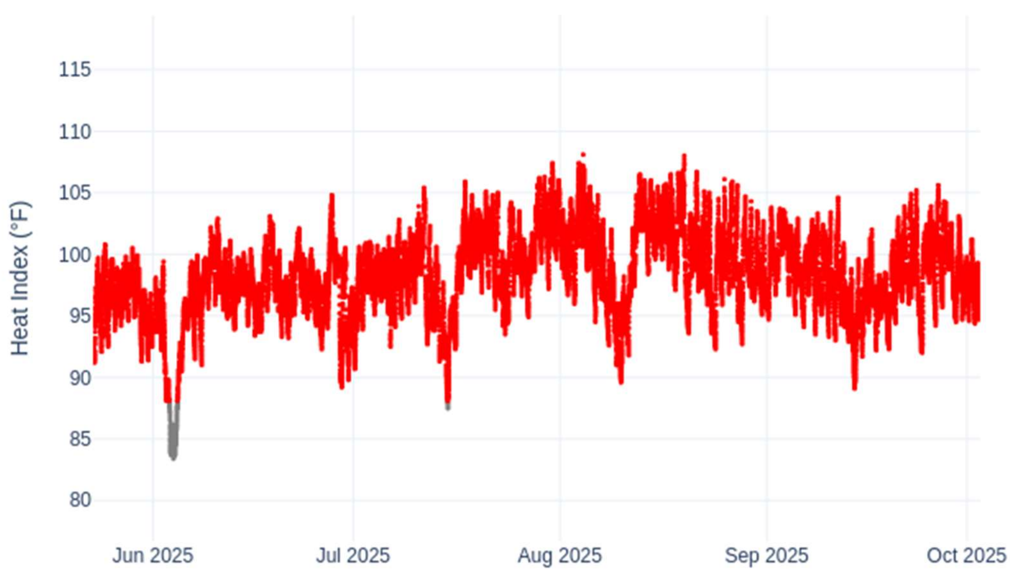

Heat Index for Building G - Wing 2 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building G - Wing 2 Hallway
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

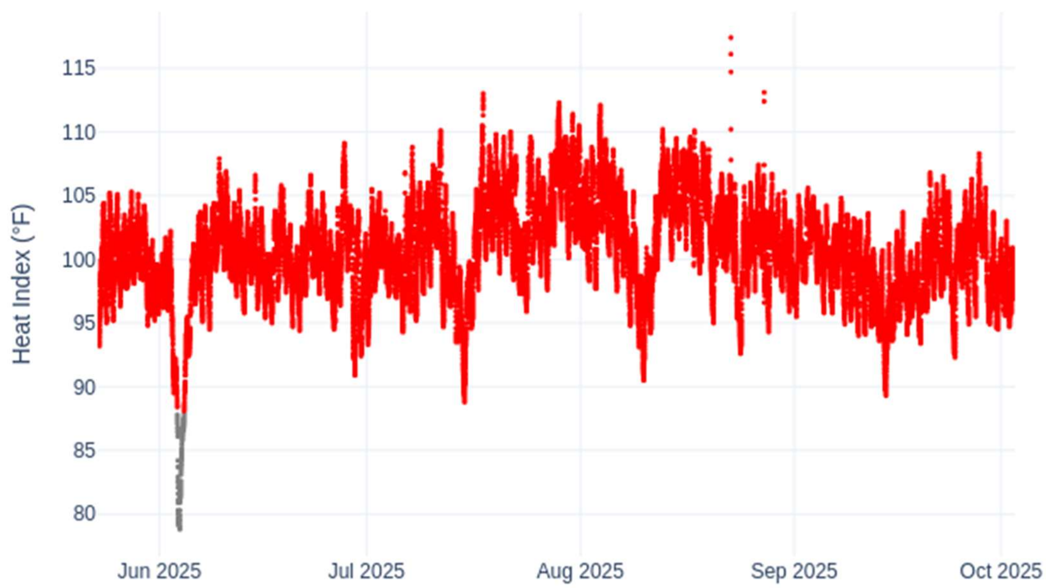
Heat Index for Building G - Wing 3 Dayroom



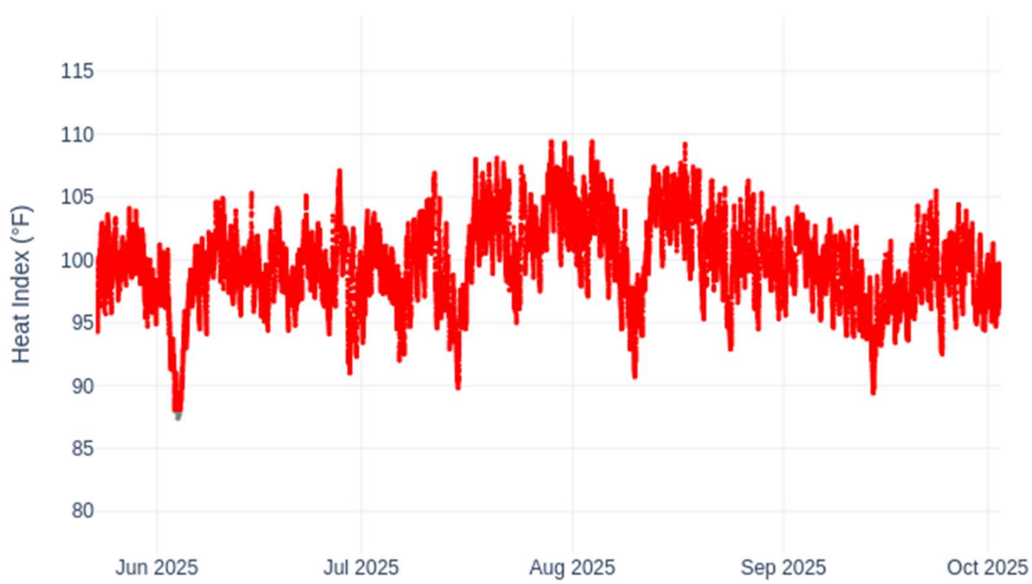
Heat Index for Building G - Wing 3 Hallway



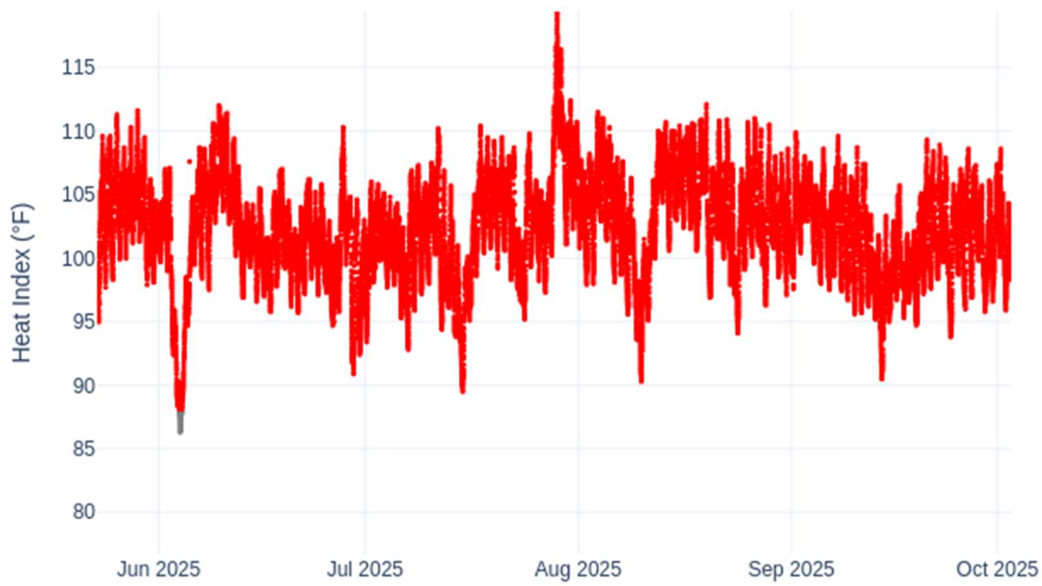
Heat Index for Building H - Wing 1 Dayroom



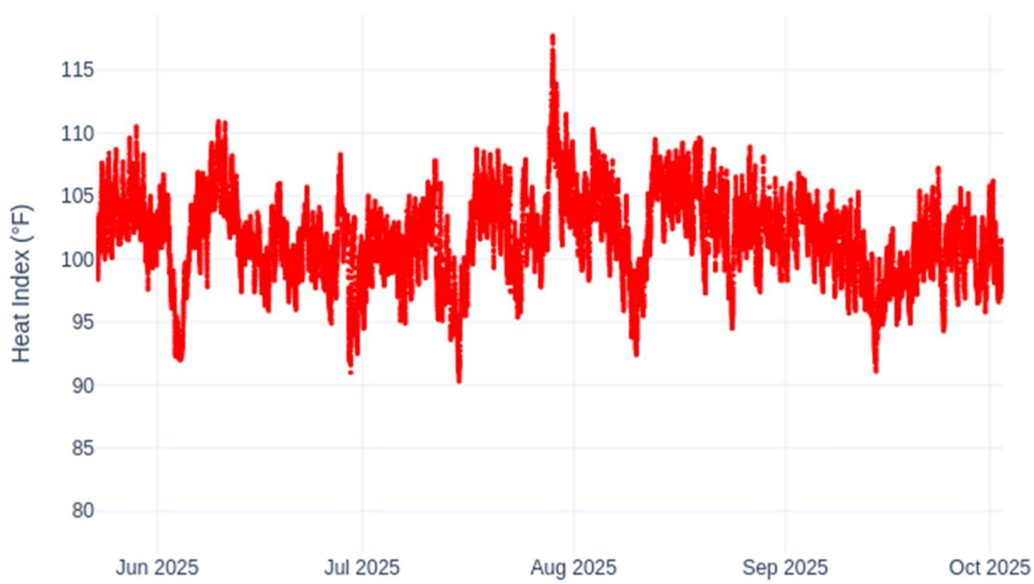
Heat Index for Building H - Wing 1 Hallway

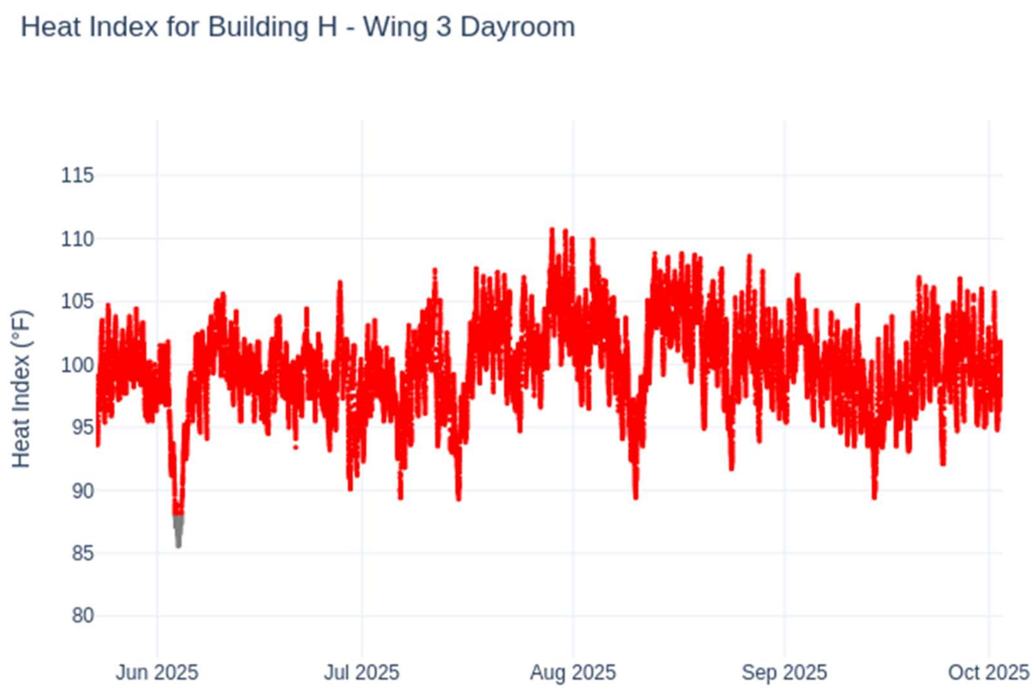


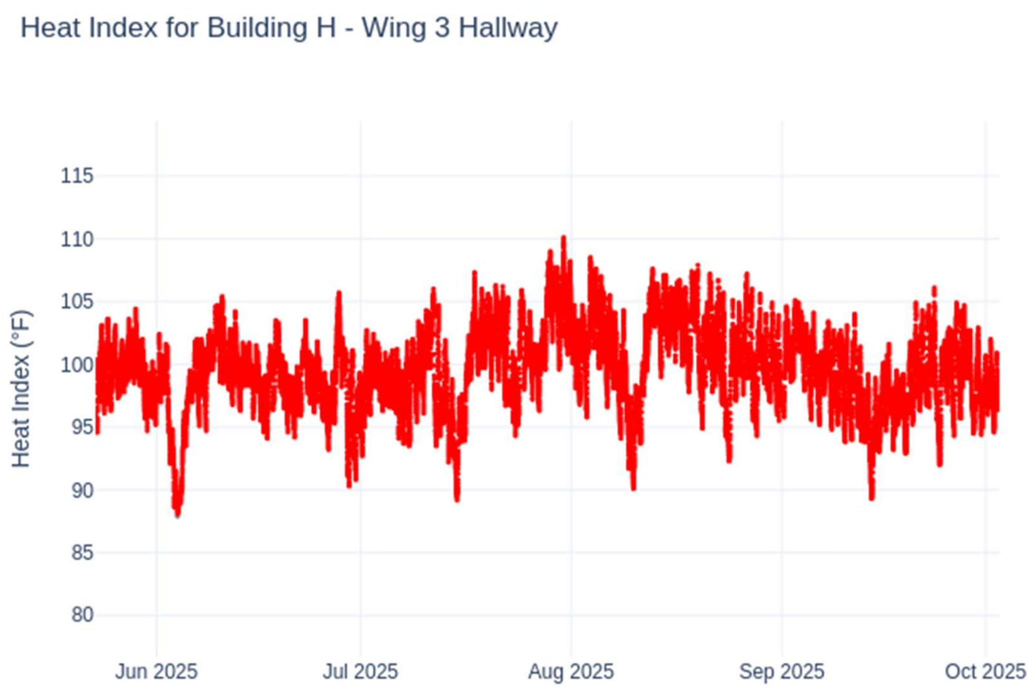
Heat Index for Building H - Wing 2 Dayroom



Heat Index for Building H - Wing 2 Hallway




Heat Index for Building H - Wing 3 Dayroom
Heat Index (°F)
115
110
105
100
95
90
85
80
Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025


Heat Index for Building H - Wing 3 Hallway
Heat Index (°F)
115
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Jun 2025
Jul 2025
Aug 2025
Sep 2025
Oct 2025

SUMMARY OF PERSONAL RECORD

Stefano Schiavon, PhD

Current Position

Professor of Architecture
Professor of Civil and Environmental Engineering
Associate Director of Research, Center for the Built Environment
Associate Director, Center for Environmental Design Research
Director of the MS-PhD BSTS program

Education

PhD Building Science-Energy Engineering (2009) at University of Padua, Italy
MSc Mechanical Engineering summa cum laude (2005) at University of Padua, Italy
Visiting student at Technical University of Denmark and Tsinghua University, China

Principal Field of Interests

Architectural Engineering/Building Science. Indoor Environment Quality; Mechanical/HVAC Systems; Sustainable Architecture; Building Energy Efficiency; Thermal Comfort; Wellbeing; Post-Occupancy Evaluation; Indoor Air Quality; Heat stress.

Major Honors and Awards

2024 Building and Environment Best Paper Award
2021 WELL community award
2018 three Building and Environment Best Paper Awards
2017 Faculty Award for Excellence in Postdoctoral Mentoring
2013 Ralph G. Nevins Physiology and Human Environment Award
2010 REHVA young scientist award

Employment History

Assistant professor at Polytechnic University of Turin, Italy
Postdoctoral scholar and assistant professional researcher at University of California, Berkeley

Publications Google Scholar citations: 14076; H-index: 59

Peer-reviewed papers in international journals: 122
Books or books chapters: 3
Peer-reviewed papers in conference proceedings: 94
Editorials: 2
Reports: 23
Software: 7
Media: 37
Wikipedia: Pages: 171. Live edits: 486

Lectures/Keynotes 91

Postdoctoral Scholar 23

Patent application 1

Grants $17,457,579

RESUME OF STEFANO SCHIAVON

Contact info

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Home: [redacted], CA-94708
Cell: +1 (510) 809-5163 | schiavon@berkeley.edu | Google Scholar | ORCID | LinkedIn

Education

2006-2009	PhD in Energy Engineering (Building Science). University of Padua, Italy. *Title:* Energy savings with personalized ventilation and cooling fans. *Supervisors*: Roberto Zecchin (University of Padua); Arsen Melikov (Technical University of Demark); Xianting Li (Tsinghua University)
1999-2005	MSc in Mechanical Engineering (5-year program). University of Padua, Italy. 110/110 summa cum laude

Visiting Scholar

05-07/'24	Visiting Scholar at Berkeley Education Alliance for Research in Singapore (BEARS) for the HEATS project in collaboration with the National University of Singapore (NUS)
12/'15-06/'16	Guest Faculty. Earnest Orlando Lawrence Berkeley National Laboratory. Building Technologies and Urban Systems / Energy Technologies Area
05-08/'14 07-08/'15 05-07/'16 05-06/'17 07-08/'18 07/19-20 05-06/'22 05-07/'23	Visiting Scholar at Singapore Berkeley Building Efficiency and Sustainability in the Tropics (SinBerBEST). In collaboration with Nanyang Technological University (NTU) and the National University of Singapore (NUS)
10/'07-06/'08	Guest PhD student at the International Centre for Indoor Environment and Energy-DTU, Denmark. Supervisor A. Melikov.
02/'06-01/'07	Guest PhD student at the Department of Building Science, School of Architecture, Tsinghua University (清华大学), Beijing. China. Supervisor Xianting Li.
06/'04-06/'05	Guest MS student International Centre for Indoor Environment and Energy-DTU, Denmark with the EU program Erasmus. Supervisor Bjarne W. Olesen and A. Melikov. Master thesis on displacement ventilation.

Specific Field of Interests

Sustainable Building Design; Building Energy Efficiency; Indoor Environment Quality; Wellbeing; Thermal Comfort; Indoor Air Quality; Mechanical Systems; Post-Occupancy Evaluation; Energy Simulation; Building Standards and Codes; Heat; Window View Quality.

Employment History

Employer	*Position*	*Beginning*	*Ending*
University of California, Berkeley	Professor of Architecture and Professor of Civil and Environmental Engineering	07/2022	Present

University of California, Berkeley	Associate Professor of Civil and Environmental Engineering	07/2020	06/2022
University of California, Berkeley	Associate Professor of Architecture	07/2017	06/2022
University of California, Berkeley	Assistant Professor of Architecture	07/2011	06/2017
Polytechnic University of Turin	Assistant Professor	12/2010	6/2011
University of California, Berkeley	Assistant Pro. Researcher	05/2010	04/2011
University of California, Berkeley	Postdoctoral Scholar	01/2009	05/2010

Short term consultancy

3. Florida Justice Institute. 2024-now. Expert report in for plaintiffs against the Florida Department of Corrections. Case No. 1:24-24253

2. Morrison & Foerster LLP and Durie Tangri LLP. 2022-2023. Expert report and deposition for defendants in National Fire Protection Association Inc. vs UpCodes Inc., Scott Reynolds and Garrett Reynolds. Case No. 2:21-cv-05262-SPG-E.

1. Google. December 2015. REWS/Aclima science advisory Panel. Assessment of Aclima sensor network for Google.

RESEARCH

Publications

Peer-review Papers in International Journals

xxx Chen X, Lv GQ, Zhuang XW, Duarte C, Schiavon S, Geyer P. 2024. Integrating symbolic neural networks with building physics: A study and Proposal. http://arxiv.org/abs/2411.00800

122 Mihalcin E, Schiavon S, Ravanelli N. 2025. Examining the physiological strain with electric fans during high indoor heat stress. Building and Environment: 113261. Open access https://doi.org/10.1016/j.buildenv.2025.113261.

121 Dallo F, Parkinson T, Duarte C, Schiavon S, Um CY, Modera MP, Raftery P, Barbante C, Singer BC. 2025. Using smart thermostats to reduce indoor exposure to wildfire fine particulate matter (PM2.5). Indoor Environments: 100088. Open access https://doi.org/10.1016/j.indenv.2025.100088

120 Aijazi A, Schiavon S, Callaway D. 2025. Building and occupant characteristics as predictors of temperature-related health hazards in american homes. Building and Environment 275: 112805. Open access https://doi.org/10.1016/j.buildenv.2025.112805

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117 Li J, Sultan Z, Schiavon S. 2024. Should we use ceiling fans indoors to reduce the risk of transmission of infectious aerosols? Indoor Environments 1 (3): 100039. Open access https://doi.org/10.1016/j.indenv.2024.100039 data available at https://doi.org/10.5061/dryad.fqz612k0w

116 Ko WH, Burgess I, Schiavon S, Chung STL, MacNaughton P, Um CY. 2024. Assessing the impact of glazing and window shade systems on view clarity. Scientific Reports 14 (1): 18392. Open access https://doi.org/10.1038/s41598-024-69026-x

115 Li J, Pantelic J, Merchant CB, Chen KW, Izuhara I, Yuki R, Meggers FM, Schiavon S. 2024. Comparison of the environmental, energy, and thermal comfort performance of air and radiant cooling systems in a zero-energy office building in Singapore. Energy and Buildings 318: 114487. Open access https://doi.org/10.1016/j.enbuild.2024.114487

114 Kent MG, Ko WH, Konstantzos I, Schiavon S, MacNaughton P, Wilkins AJ. 2024. The design of window shades and fenestration for view clarity. Lighting Research & Technology: 14771535241261270. https://doi.org/10.1177/14771535241261270 https://escholarship.org/uc/item/4n6102mf

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112 Porras-Salazar JA, Tartarini F, Schiavon S. 2024. The effect of indoor temperature on work performance of fifty-eight people in a simulated office environment. Building and Environment 263: 111813.
https://doi.org/10.1016/j.buildenv.2024.111813

111 Aijazi A, Parkinson T, Zhang H, Schiavon S. 2024. Passive and low-energy strategies to improve sleep thermal comfort and energy resilience during heat waves and cold snaps. Scientific Reports, 14: 12568. Open access
https://doi.org/10.1038/s41598-024-62377-5
https://www.nature.com/articles/s41598-024-62377-5

110 Sun R, Schiavon S, Brager G, Arens E, Zhang H, Parkinson T, Zhang C. 2024. Causal Thinking: Uncovering Hidden Assumptions and Interpretations of Statistical Analysis in Building Science. Building and Environment 259, 111530. Open access Building and Environment 2024 Best Paper Award
https://doi.org/10.1016/j.buildenv.2024.111530.

109 André M, Schiavon S, Lamberts R. 2024. Implementation of desk fans in open office: Lessons learned and guidelines from a field study. Building and Environment 259, 111681. Open access
https://doi.org/10.1016/j.buildenv.2024.111681

108 Sultan Z, Li J, Pantelic J, Schiavon S. 2024. Particle characterization in commercial buildings: A cross-sectional study in 40 offices in Singapore. Science of The Total Environment, Volume 927, 2024, 172126.
https://doi.org/10.1016/j.scitotenv.2024.172126

107 Das HP, Lin YW, Agwan U, Spangher L, Devonport A, Yang Y, Drgoňa J, Chong A, Schiavon S, Spanos CJ. 2024. Machine Learning for Smart and Energy-Efficient Buildings. Environmental Data Science, 3:e1. Open access
https://doi.org/10.1017/eds.2023.43

106 Chen X, Sun R, Saluz U, Schiavon S, Geyer P. 2024. Using causal inference to avoid fallouts in data-driven parametric analysis: a case study in the architecture, engineering, and construction industry. Development in the Built Environment, 17, 100296. Open access
https://doi.org/10.1016/j.dibe.2023.100296

105 Tartarini F, Frei M, Schiavon S, Chua YX, Miller C. 2023. Cozie Apple: An iOS mobile and smartwatch application for environmental quality satisfaction and physiological data collection. Journal of Physics: Conference Series, Health & productivity, 2600, 142003. Open access
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http://dx.doi.org/10.2139/ssrn.4480684 (pre-print)

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https://doi.org/10.1016/j.buildenv.2023.110132
https://escholarship.org/uc/item/46p439jv

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https://doi.org/10.5334/bc.274

100 Kent M, Huynh NK, Schiavon S, Selkowitz S. 2022. Using support vector machine to detect desk illuminance sensor blockage for closed-loop daylight harvesting. Energy and Buildings 274: 112443. Open access
https://doi.org/10.1016/j.enbuild.2022.112443

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https://doi.org/10.1111/ina.13160

98 Wu Z, Li N, Schiavon S. 2022. Experimental evaluation of thermal comfort, SBS symptoms and physiological responses in a radiant ceiling cooling environment under temperature step-changes. Building and Environment 224: 109512.
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97 Sultan Z, Li J, Pantelic J, Schiavon S. 2022. Indoor air pollution of outdoor origin: Mitigation using portable air cleaners in Singapore office building. Aerosol and Air Quality Research 22 (10): 220204. Open access
https://doi.org/10.4209/aaqr.220204

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https://doi.org/10.1038/s41597-022-01475-3 - data available at
https://doi.org/10.6084/m9.figshare.16920118.v6 and https://ashraeobdatabase.com

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3. UFAD Cooling Airflow Design Tool. Version 2. 07/03/2014. The design tool is freely available at: https://centerforthebuiltenvironment.github.io/ufad_design_tool/. UFAD Cooling Airflow Design Tool. Version 1. 06/10/2010.

2. CBE UFAD Simulation Toolkit. Excel interface for EnergyPlus 3.1 to simulate an UFAD system. 2010. The design tool is not anymore maintained and available to the public.
1. Cooling Airflow Design Tool for Displacement Ventilation (DV). Excel 2007/VBA version of the ASHRAE method for calculating the amount of design cooling airflow required for a displacement ventilation (DV) system. 2010. The design tool is not anymore maintained and available to the public.

Invention disclosure

3. System to Reduce Indoor Particulate Exposure in Residential Buildings. Thomas Parkinson, Federico Dallo, Carlos Duarte, Stefano Schiavon, Mark Modera. Based on CITRIS grant 2022. July 2022. BK-2023-002.
2. Calibrated Thermal Comfort Control for a System of Fans. Stefano Schiavon – 40% (UCB), Weng Khuen Ho – 30% (NUS), Keck Voon Ling – 20% (NTU), Le Yin – 5% (NTU), Shuo Liu – 5% (NUS). Based on NRF CREATE program SinBerBEST $55,625,000 2012-2017. July 2015. TD/198/15. BK-2016-007. This is now a provisional patent (filed 03/11/2016). US provisional application number 62/307,223.
1. Optimized Air Movement Control based on Occupants Feedback. Weng Khuen Ho – 30% (NUS), Stefano Schiavon – 30% (UCB), Keck Voon Ling – 20% (NTU), Le Yin – 10% (NTU), Shuo Liu – 10% (NUS). Based on NRF CREATE program SinBerBEST $55,625,000 2012-2017. June 2015. TD/174/15. BK-2015-203

Patent application

1. Stefano Schiavon – 40% (UCB), Weng Khuen Ho – 30% (NUS), Keck Voon Ling – 20% (NTU), Shuo Liu – 5% (NUS), Le Yin – 5% (NTU). Method of controlling a plurality of fans disposed in an area to provide thermal comfort control. World Intellectual Property Organization WO 2017/155472 A1, issued September 14, 2017. PCT Application NO: PCT/SG2017/050119.

Grants from external agencies

Role, Status, Agency, Start date and End date and Title	***Total (k$)***
co-PI. 2025. Submitted. 1918-TRP: The Verification of Openings, the Limitations of Openings, Air Distribution and Humidity Conditions in Naturally Ventilated Spaces to Complement Section 6.4 of ASHRAE Standard 62.1. ASHRAE. 09/2025-12/2027	(195.1)
PI.2025. Submitted. 1925-TRP Development of View Clarity Metrics for Fenestration Systems. ASHRAE. 09/2025-08/2027	(130.3)
PI. 2025. Ongoing. Occupant IEQ Survey 2025 for Renew America's Schools (IUT #7800727). 2/2025-2/2026	48.9
PI. 2025. Not Funded. Advancing Indoor PM 2.5 Monitoring with Low-Cost Sensors through Multi-Pollutant Fusion and Machine Learning. Bakar Fellowship. 10/2025-09/2028.	($300)
PI. 2025. Not Funded. Smart Thermostat Algorithm to Predict Indoor Heat Risk. Bakar Fellowship. 10/2025-09/2028.	($300)
PI. 2025. Ongoing. Analyzing Cost-Effectiveness and Mitigation Potential of Low-Carbon Building Material Alternative. Funder: California Air Resources Board. 4/2025-4/2027-	499.831
PI. 2024. Ongoing. Research and Development to Support In-Situ Evaluations of Air Mixing Impacts on Germicidal Ultraviolet Disinfection in Buildings (IUT # 7721216). 11/2023-12/2025	175.1

PI. 2024. Ongoing. Commercial Kitchen Indoor Environmental Quality (IEQ) Field Study (IUT #7733231). 01/2024-03/2025 (extended to 11/2025)	123.6
PI. 2024. Ongoing. HEATS: Heat Exposure, AcTivity, and Sleep. Funder: Singapore National Research Foundation. (SGD 5,000k) 01/2024-01/2027.	3,725.950
Co-I. 2023. Not Funded. Safe air for all Californians. California Climate Action Initiative. 9/1/2023-8/31/2025.	(10,000)
Co-I. 2023. Not Funded. CITRIS Climate: a holistic approach to climate action for community resilience and sustainability. California Climate Action Initiative. 9/1/2023-8/31/2025.	(10,000)
Co-I. 2023. Not Funded. Building Life-Cycle Academy: Solutions for Climate Mitigation and Adaptation. California Climate Action Initiative. 9/1/2023-8/31/2025.	(5,030)
Co-PI. Active. 2023. Establishing Maximum Thermal Conditions for California Residential Dwellings (AB209). California Department of Housing and Community Development. 6/1/2023-6/30/2025	1,307.548
Co-PI. Not Funded. 2022. Evaluating housing infrastructure improvements to mitigate exposure to extreme heat and associated adverse health outcomes" Hosting institution Aga Khan University. Funder: The Wellcome Trust Limited. 1/1/2023-12/31/2027.	(260)
Co-PI. Not funded. 2021 CITRIS Core Seed Funding. Fine-Grained Carbon Footprint Modeling of Building Energy Consumption for Decarbonization.	(60)
PI. Past 1/1/2022-12/31/2022 CITRIS Core Seed Funding. Clearing the air: using smart thermostats to improve wildfire resiliency in Californian homes.	50
Co-PI. Not Funded. C3.ai Digital Transformation Institute. Resilient Buildings: optimization of building ventilation during wildfires and pandemics using artificial intelligence.	(233)
Co-PI. Past. BOSCH. 12/2019-4/2021. Study of the impact of VRF delivery air temperature and movement in an occupied space under controlled chamber conditions. (SGD 50k)	37.1
Collaborator. Past. 10/2020-01/2021. Central Gap Fund (Covid-19 Challenge): Coupling UVC lamps and occupancy sensing for extensive disinfection in built-environment. Singapore National Research Foundation. (SGD 49.6k)	36.8
Co-PI. Current. Sanken. 7/2017-5/2022. Field study for radiant installation in BCA ZEB^{PLUS}.	88
PI and Theme Leader. Current. 9/2017-6/2024. SinBerBEST. Singapore Berkeley Building Efficiency and Sustainability in the Tropics. ~$170k/year for 5 years to be used in Berkeley. ~880k/year for 5 years for Theme A to be used in Singapore.	5250
PI. Past. Siebel Energy Institute. 5/2017-11/2017. Incorporating Real-time Thermal Comfort and Indoor Occupancy into Building Management Systems	50
PI. Past. Lawrence Berkeley National Laboratory. 5/2015 – 9/2015. Fabrication of Thermal Manikins for Testing in LBNL's FLEXLAB	20.3
Co-PI. Past. Electric Program Investment Charge. 07/2015-06/2018. Approved on 11/19/2014. Optimizing Radiant Systems for Energy Efficiency and Comfort	2,939.964
PI. Past. BEARS. 09/2014-03/2018. $425,000. SinBerBEST. Singapore Berkeley Building Efficiency and Sustainability in the Tropics	425
PI. Past. BEARS. 10/2014-10/2015. Building performance modeling of SinBerBEST energy saving strategies	85
PI. Past, Berkeley Educational Alliance for Research in Singapore (BEARS)/SinBerBEST project. 2014 Energy Efficient Fan in Warm Indoor Environment--A Human Response Study in the Tropics	38.7
PI. Not funded, ASHRAE 03/2014-02/2016. New Investigator Award	(65)

Co-PI. Past, California Energy Commission, PIER. 06/2012-01/2015. PON 12-503 Changing the rules: Innovative low-energy occupant-responsive HVAC controls and systems	1,629.4 Pier 192.5 CBE
PI. Not funded. U. S. Green Building Council. IEQ Strategies and Occupant Satisfaction: understanding what works.	(245.7)
Co-PI. Past. California Energy Commission, PIER. 06/2012-01/2015 Space conditioning in near zero-net-energy (ZNE) buildings.	300
Co-PI. Not funded. NSF National Science Foundation. 07/2012-06/2016. SEP: Smart People, Products and Building on the Smart Grid	(1,993)

Gift

Agency, Start date and End date (if any) and Title	***Total (k$)***
SCHÜCO. 04/2025. Gift given to me to support research on sustainable and healty building	25
SANKEN. 07/2024. Gift given to me to support research on sustainable mechanical systems	140
SANKEN. 05/2022. Gift given to me to support research on radiant systems	140
View Inc. 05/2021. Gift given to CBE (I am the lead contact) to support research on window view quality.	77
SANKEN. 05/2020. Gift given to me to support research on radiant systems	140
Aeratron. 9/2017. Donation of 23 Ceiling Fan to the SinBerBEST project	19
Dyson. 05/2017. Donation of 75 Bladeless Fan to the SinBerBEST project.	22
Price Industries. 02/2014. Gift given to Ed Arens to support research on HVAC. Paul Raftery, Fred Bauman, and I worked on this gift.	15

TEACHING

Teaching Record

Arch 140 - Energy and Environment: S24, S23, S22, S21, S19, S18, S17, S15, S14, S13, S12

Arch 246 - Building Energy Simulations: F23, F21, F18, F16, S14, S13

Arch 241 - Research Methods in Building Science: F24,F22, F20, F18, F17, F15, F13, F11

Arch 298 - Faculty Research Colloquium: F25, S18, F16

Arch 249/ER 290 - Assessing Building Energy Use and IEQ: F15, F14, F13

Arch 249 - Integrated Mechanical Design for Zero Energy Buildings: F14

Arch 249 - Climate and Energy Analysis for Bay Area buildings: S12

Arch 298 - Cooling: mechanical systems in commercial buildings: F10

Arch 249 - Using R for building science (IOR): S22

PhD mentoring internal (Student. Title of the dissertation. Role. First work after graduation. Date)

Lino Sanchez. Main supervisor

Sun Woo Chang. Main supervisor. QE Spring 2025.

Aoyu Zou. Secondary supervisor. QE Spring 2025.

Chai Um. Main supervisor. QE Spring 2024.

Chitra Nambiar. Secondary supervisor. Chair of the QE Fall 2023.

Ruijin Sun. Main supervisor. QE Summer 2023

Arfa Aijazi. Secondary supervisor. Chair of the QE Fall 2021.

Won Hee Ko. View and environmental quality in buildings. Main supervisor. Served in the Qualification exam (13/03/2019). Assistant Professor at NJIT. 08/2021

Jonathan Woolley. A multi-method investigation into design and control of radiant cooling and heating systems. Main supervisor. Served in the Qualification exam (12/05/2017). 06/2020

Carlos Roa Duarte. Design and control of high thermal mass radiant systems. Main supervisor. Served in the Qualification exam (12/11/2017). Postdoc at UC Berkeley. 07/2020

Joyce Kim. Advancing comfort technology and analytics to personalize thermal experience in the built environment. Served as Chair of the Qualification exam (3/14/2016). Assistant Professor at the University of Waterloo. 04/2018

Caroline Karmann. Thermal comfort and acoustic quality in buildings using radiant systems. Arup and Postdoc at EPFL. Main supervisor. Served in the Qualification exam (2/6/2015). 06/2017

Jingjuan Dove Feng. Design and control of hydronic radiant cooling systems. Chair. LBNL/ Taylor Engineering. 05/2014

PhD mentoring external

Kecheng Chen. Shallow geothermal potential assessment for district heating and cooling (DHC). Dissertation committee member. CEE. 12/2024

Wenhao Zhang. Secondary PhD advisor at NUS.

Toby Seah. Secondary PhD advisor at NUS.

Raagavi Mani. Secondary PhD advisor at NUS.

Samuel Fernandes. CEE. QE in Spring 2023.

Yu-Wen (Wendy) Lin. Toward platform-based Building Design. Dissertation committee member. Served in the Qualification exam (11/2021) and in the dissertation committee. EECS. 05/2023

Lucas J. Spangher. Deploying and developing sim-to-real reinforcement learning techniques with applications in energy demand response. Dissertation committee member. EECS. Postdoc at MIT. 12/2022

Neal Jackson. A case for application driven design of energy harvesting sensor systems. Served in the Qualification exam (07/2021) and in the dissertation committee. EECS. 12/2022

Gabe Fierro. Self-Adapting Software for Cyberphysical Systems. Dissertation committee member. EECS. Assistant professor of Computer Science at Colorado School of Mines and NREL. 05/2021

Hari Prasanna Das. Data-centric machine learning for human-centric applications. Served in the Qualification exam (04/2021) and in the dissertation committee. EECS. 07/2023

Ioanna Kavvada. Optimal regional earthquake risk mitigation planning for the building infrastructure. Served in the Qualification exam (12/14/2020) and in the dissertation committee. CEE. PGE. 08/2022.

Fiona Greer. Life-cycle environmental and economic management of airport infrastructure and operation. Served in the Qualification exam (11/23/2020) and in the dissertation committee. Postdoc at UC Berkeley. 12/2021 CEE

Matias Alberto Quintana Rosales. Cohort-based personal comfort models for HVAC occupant-centric control. Served in the Qualification exam (06/22/2020) and external supervisor. National University of Singapore. Postdoc at NUS. 10/2022

Daniela Maria Martinez Lopez. Served in the Qualification exam (2/4/2019) and in the dissertation committee. 12/2021CEE.

Baihong Jin. Incipient anomaly detection with ensemble learning. Served in the Qualification exam (5/2/2018) and in the dissertation committee. Postdoc at UC Berkeley EECS. 08/2020

Antony Kim. Served as Chair of the Qualification exam (12/4/2017).

Ioannis Konstantakopoulos. Statistical learning towards gamification in human-centric cyber-physical systems. Served in the Qualification exam (10/13/2016) and in the dissertation committee. EECS. Amazon. 12/2018

Olga Kavvada. Spatial modeling of decentralized wastewater infrastructure: The case for water reuse and nitrogen recovery. Served in the Qualification exam (04/29/2016) external advisor. CEE. Researcher ENGIE Lab CRIGEN. 11/2017

Ming Jin. Data-efficient analytics for optimal human-cyber-physical systems. Served in the Qualification exam (4/29/2016). EECS. Postdoc at UC Berkeley. 12/2017.

Imran Sheikh. Served in the Qualification exam (S/2016). ERG

Alex Mead. Hardware-in-the-loop modeling and simulation methods for daylight systems in buildings. Served in the Qualification exam (12/07/2015) and external advisor. CEE. 05/2017

Aashish Ahuja. Simulation of innovative solutions for energy efficient building façades. Served as external dissertation committee member (12/2015) and external advisor. ME

Eric Burger. Served in the Qualification exam (11/20/2015), external dissertation committee member and external advisor. CEE.

Yuxun Zhou. Statistical learning for sparse sensing and agile operation. Served in the Qualification exam (5/5/2015), external dissertation committee member and external advisor. EECS. 05/2017

Matthew Vannucci. Human-centric Indoor Air Quality. Served in the Qualification exam (2/6/2015), external dissertation committee member and external supervisor. CEE. 06/2018

Zhaoyi Kang. Efficient multi-level modeling and monitoring of end-use energy profile in commercial buildings. Served in the Qualification exam (03/01/2013), external dissertation committee member and external advisor. EECS. 06/2015

Monika Frontczak. Human comfort and self-estimated performance in relation to indoor environment parameters and building features. Main supervisor Pawel Wargocki. Civil Engineer at Asplan Viak. Norway. 11/2011

MS mentoring

Riwayat Katia. Load shifting and enhancing energy savings with dynamic ventilation strategies in multi-family residential buildings. Lamarr.AI. 12/2024

Harry Jiang. Assessing overheating risk and energy impacts in California's residential buildings. Arup. 12/2024

Marya Sara Kemp Thawer. Screening method to identify high VAV minimum airflow rates and retrofit opportunities. Introba. 12/2023.

Isabel Burges. View Clarity: A human subject laboratory assessment of the effect of window films, electrochromic glass and fabric shades on visual acuity, contrast sensitivity, color perception and satisfaction. The Princeton Review. 05/2023

Yi Ju. Robo-chargers: optimal operation and planning of a robotic charging system to alleviate overstay. PhD student at UC Berkeley. 05/2023

Patrick Wendler. Variable air volume hot water reheat terminal units: Temperature stratification, performance at low hot water supply temperature, and myths from the field. Taylor Engineers. 12/2022

Emily Lamon. Boiler retrofits and decarbonization in existing buildings: HVAC designer interviews. Tangible Materials. 03/2022.

Emily Miller. The effect of control and optionality on occupant satisfaction in shared living environments. Arup. 06/2022.

Jing Yuan. A review of multisensory studies in built environment: Implications for biophilic design studies. Johnsons & Johnsons. 12/2021.

Isabelle Hens. Life cycle impacts of timber unitized curtain wall. Atelier Ten. 12/2021

Hari Prasanna Das. Graphical Lasso based Cluster Analysis in Energy-Game Theoretic Frameworks. 09/2021.

Yuming Xu. Capturing energy savings from correcting VAV box minimums on campus. Mayers+ Engineers. 05/2021

Dana Miller. Cooling energy savings and occupant comfort in a two year field study of automated ceiling fans installed as retrofits in 7 air conditioned buildings. EnelX. 05/2020

Benjamin Taube. Energy and comfort performance assessment for a new occupancy sensing thermostat in residential buildings. Navigant. 05/2020

Megan Dawe. Field evaluation of occupant satisfaction and energy performance in eight LEED-certified buildings using radiant systems. Carbon Lighthouse. 06/2019

Sebastian Cohn. Development of a Personal Heater Efficiency Index. Association for Energy Affordability. 09/2017

Jared Landsman. Performance, prediction and optimization of night ventilation across different climates. Integral Group. 06/2016

Priya Ghandi. Commercial office plug load energy consumption trends and the role of occupant behavior. WSP Flack + Kurtz. 06/2015

Kristine Walker. Indoor environment quality in green-rated buildings: Understanding the people and conditions affecting performance. Chair. PG&E. 06/2015

Bin Chen. Assessment and improvements of the CBE Underfloor Air Distribution (UFAD) Cooling Load Design Tool. Chair. WSP Flack + Kurtz. 06/2014

David Heinzerling. Commercial building indoor environmental quality evaluation: Methods and tools. Chair. Taylor Engineering. 12/2012

Alberto Piccioli. Thermal comfort visualizations on a web-based tool for ASHRAE 55 Standard. MS UCL (London). 3/26/2013

Gwen Fuertes. Simulated and actual energy use: The role of plug loads. Chair. MS. 05/2014. Leddy Maytum Stacy Architects

Brennan Less. Indoor air quality in 24 California residences designed as high-performance green homes. LBNL. 12/2012

Chandrayee Basu. Critical simulation based evaluation of thermally activated building systems (TABS) design models. UC Berkeley. 12/2012

Christian Ampò. Fan pressurization tests (blower door) in residential building in Italy. HVAC/AHU sale manager at FAIT Aeraulica, Italy. 04/2009

Clara Peretti. Evaluation of Indoor Environment Quality with a Web-based Occupant Satisfaction Survey: A Case Study in Northern Italy. PhD at Padua University. 12/2009

Other mentoring

Minghao Xu. MArch thesis. Whale Fall: Reoccupy the Remnants of San Francisco's Parking Structures. 1-5/2024
Data Science Discovery Project "Simplified web-based application to help design high thermal mass radiant systems" and "comfortDAT - an open-source data analysis toolkit for thermal comfort research". Mentored three undergraduate students. 8-12/2023
Li Leo. MArch thesis. Theater Village. 1-5/2023

Mentored 4 undergraduate students the Undergraduate Research Apprentice Program about view clarity experiments. 8/2022-5/2023
Qingquan Chen and Seoyeon Park. Undergraduate. View clarity. 8-12/2022

Ciera Gordon. March thesis. Embedded architecture. 1-5/2022

Hannah Wong. Undergraduate (math major). Thermal comfort tool. 2-8/2016

Feifei Cao. MArch. Oblique Explorations. Urban infrastructural hybrid. 1-5/2013

Elizabeth Kee. March. I guided her on the sustainable and indoor air quality design of a tuberculosis clinic and lab for the Karen department of Health and Welfare in a refugee camp. 05/2012-13
Shiyang Chen. Undergraduate. Thermal comfort tool graphical visualization. 7/2011-1/2012

Visiting Scholar

Alessandra Luna Navarro. Delft University. 1/2024-5/2024
Emanuele Naboni. Università di Parma. 12/2022-2/2023
JaeHan Lim. Ewha Womans University.1/2022-2/2023
Kwok Wai Tham. National University of Singapore. 5-6/2019
Kwok Wai Tham and Chandra Sekhar. National University of Singapore. 5-6/2018
Veronica Soebarto. The University of Adelaide. 8/2017-1/2018
Sergio Altomonte. University of Nottingham. 8/2012-2/2013 and 7-9/2016 and 4-5/2017

Visiting Students

Xia Chen (TU Berlin/Leibniz Universität Hannover). Katherine Exss (University del Biobío). Marcello Turrini (U Parma). Federico Dallo (Venice U). Maíra André (Federal University of Santa Caterina). Haida Tang (Tsinghua U), Baisong Ning (Hunan U), Eleftherios Bourdakis (DTU), Alan Kabanshi (Galve U), Yongmei Xuan (Zhejiang U), Monika Frontczak (DTU), Alberto Piccioli (Bologna U).

Postdoctoral Students

23. Michéle Renard. PhD at Technological University of the Shannon. Secondary supervisor. 01/2025-now
22. Xiaojun Fan. PhD at Technical University of Denmark. Main supervisor. 06/2024-now
21. Shawn Tan. PhD at National University of Singapore. Secondary supervisor. 09/2024-now
20. Beverly Tan. PhD at Massey University. Secondary supervisor. 04/2024-08/2024
19. Mario Frei. PhD at ETH. Main supervisor. 04/2024-now
18. Tobias Kramer. PhD at Queensland University of Technology. Main supervisor. 02/2024-now
17. Jiayu Li. PhD at Tianjin University. Main supervisor. 11/2023-now.
16. Federico Dallo. PhD University of Ca 'Foscari Venezia. Main Supervisor. 02/2022-02/2023. Professional Researcher at National Research Council of Italy.
15. Zhibin Wu. PhD Hunan University. Main Supervisor. 08/2020-08/2021. Postdoc at Karlsruhe Institute of Technology (KIT) and Assistant Professor at XUAT.
14. Jose Ali Porras Salazar. PhD at University of BioBio. Main Supervisor. 09/2019-12/21. Assistant Professor at University of Costa Rica.
13. Federico Tartarini. PhD at University of Wollongong. Main Supervisor. 06/2019-11/2022. Postdoc at The University of Sydney.
12. Thomas Parkinson. PhD at University of Sydney. Main Supervisor 05/2018-05/2019. Professional researcher at UC Berkeley and Assistant Professor at The University of Sydney.
11. Baisong Ning. PhD at Hunan University. Main Supervisor. 06/2018-05/2020. Assistant Professor at Zhengzhou University.
10. Michael Kent. PhD at University of Nottingham. Main Supervisor. 09/2018-12/2023. André Hoffmann Fellow at Singapore University of Social Sciences (SUSS).
9. Jiayu Li. PhD at Tianjin University. Main supervisor. 08/2018-12/2022. Singapore National Environmental Agency.
8. Asit Mishra. PhD at Indian Institute of Technology Kharagpur. Main Supervisor. 05/2018-12/2020. Postdoc at National University of Ireland.

7. Liu Shuo. PhD at National University of Singapore. Main Supervisor 10/2016-09/2017. Huawei
6. Aleksandra Lipczyńska. PhD at Silesian University of Technology, Poland and Technical University of Denmark. Main supervisor 1/2016-12/2018. Assistant Professor at Silesian University of Technology.
5. Dexiang Zhou. PhD at Nanyang Technological University. Main supervisor. 01/2016-04/2017
4. Chin To (Toby) Cheung. PhD at Honk Kong Polytechnic University. Main supervisor. 10/2015-12/2021. Researchers at National University of Singapore.
3. Shichao Liu. PhD at University of Texas Austin. Main supervisor. 01/2015-12/2017. Assistant Professor at Worcester Polytechnic Institute (WPI)
2. Donghyun Rim. PhD at University of Texas Austin. Co-supervisor with Bill Nazaroff. I supervise roughly 20% of his research time.01/2013-06/2014. Assistant Professor at The Pennsylvania State University
1. Bin Yang. PhD at Technical University of Denmark, National University of Singapore. Co-supervisors with Bill Nazaroff. I supervise roughly 50% of his research time. 03/2013-06/2014. Assistant Professor at Umeå University.

Professional researcher

Thomas Parkinson. PhD at University of Sydney. 5/2019-03/2023. Assistant Professor at The University of Sydney.

Jovan Pantelic. PhD at National University of Singapore. 1/2016-12/2020. Scientist at WELL Living Lab.

External PhD examiner

Maíra André. University of Santa Catarina, Brazil. Qualify exam committee member on 07/2021.
Haein Cho. University of Geneva. 11/2020

Roshanak Ashrafi. A contactless non-intrusive approach for personalized thermal comfort model development in the built environment. UNC Charlotte. PhD committee member since 07/2019. Qualify exam committee member on 04/2021. Dissertation defense on 07/2022.
Panu Mustakallio. Aalto University. 10/2017

Shan Xin. Nanyang Technological University. 11/2017

Fan Zhang. The University of Sydney. 05/2016

Jungsoo Kim. The University of Sydney. 09/2013

Faculty review examiner

Associate Professor without Tenure, 02/2025
Full professor case, 10/2024
Tenure review case, 04/2023
Tenure review case, 09/2022
Tenure review case, 12/2021
Tenure review case, 07/2021

SERVICE

Conference activities

IAQVEC 2026. International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings, Los Angeles, USA. International Scientific Committee Advisory, Reviewer. 04/2025-07/2026

ISHVAC 2025. The 14th International Symposium on Heating, Ventilating, and Air Conditioning, Tokyo, Japan. International Scientific Committee Advisory, Reviewer. 02/2025-12/2025

COBEE 2025. The 6th International Conference on Building Energy and Environment (COBEE 2025), Eindhoven, Netherlands. International Scientific Committee Advisory, Reviewer. 09/2024-06/2025

ISHVAC 2023. The 13th International Symposium on Heating, Ventilation and Air-conditioning, Beijing, China. International Scientific Committee Advisory, Reviewer. 08/2023-11/2023.

Healthy Buildings 2023 Europe international conference Aachen, Germany. International Scientific Committee Advisory, Reviewer. 09/2022-06/2023. Did not perform review of papers due to high workload.

Healthy Buildings 2023 Asia and Pacific Rim international conference Tianjin, China. International Scientific Committee Advisory, Reviewer. 07/2022-07/2023.

CATE 22. Comfort At The Extremes. Edinburgh, UK. International Scientific Committee Advisory, Reviewer. 05/2022-010/2022.

17th International Conference of the International Society of Indoor Air Quality & Climate (IA2022), Kuopio, Finland. International Scientific Committee Advisory, Reviewer. 01/2022-06/2022

Co-organized and moderate the first Symposium on Research and Design Practice Related to Window Views. 10/2021. Online.

COBEE 2022. 5th International Conference on Building Energy and Environment. Committee Advisory and reviewer. Montreal, Canada. 08/2021-07/2022.

HB2021. Healthy Buildings 2021 Europe. Committee Advisory and reviewer. Oslo, Norway. 09/2020-07/2021.

ISHVAC2021. 12th International Symposium on Heating, Ventilation and Air-conditioning. Oslo, Seoul, Korea. 12/2020-11/2021.

SimAUD 2020. Symposium on Simulation for Architecture and Urban Design. International Scientific Committee Advisory and reviewer. Vienna, Austria. 02/2020-05/2020

11th Windsor Conference. Windsor, UK. International Scientific Committee Advisory, reviewer. 8/2019-04/2020.

16th International Conference of the International Society of Indoor Air Quality & Climate (IA2020), Seoul, Korea. International Scientific Committee Advisory, Reviewer. 08/2019-07/2020

10th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2019), Bari, Italy. International Scientific Committee Advisory, Reviewer. 09/2018-09/2019

SimAUD 2019. Symposium on Simulation for Architecture and Urban Design. International Scientific Committee Advisory and reviewer. Atlanta, Georgia. 09/2018-04/2019

Building Simulation 2019. Rome, Italy. Reviewer. 07/2018-09/2019.

Indoor Air 2018. Philadelphia, Pennsylvania. International Scientific Committee Advisory and reviewer. 01/2018-07/2018

SimAUD 2018 Conference. Delft, Netherlands. International Scientific Committee Advisory, reviewer 11/2017-06/2018

10th Windsor Conference. Windsor, UK. International Scientific Committee Advisory, reviewer. 8/2017-04/2018. Chaired a workshop on Personal Comfort Models.

Co-organized with Susan Ubbelohde and Christoph Reinhart DIVA DAY 2017 in Berkeley. 10/27/2017

International Roomvent and Ventilation 2018 Conferences. Espoo. Finland. http://www.roomventilation2018.org International Scientific Committee Advisory, reviewer. 02/2017-06/2018

International Building Physics Conference. Syracuse, NY, USA. International Scientific Committee Advisory, reviewer. 02/2017-09/2018

Healthy Buildings Europe. Lublin, Poland. International Scientific Committee Advisory, reviewer. 10/2016-07/2017

9th Windsor Conference. Windsor, UK. International Scientific Committee Advisory, reviewer. 8/2015-04/2016

9th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2016), Seoul (Songdo), Korea. International Scientific Committee Advisory, Reviewer. 07/2015-10/2016

14th International Conference on Indoor Air Quality and Climate 2016. Ghent, Belgium. International Scientific Committee Advisory, reviewer, Chair. 06/2015-07/2016

Healthy Building America 2015. Boulder, Colorado, US. http://hb2015-america.org International Scientific Committee Advisory, reviewer. 12/2014-06/2015

9th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC) and the 3rd International Conference on Building Energy and Environment (COBEE). 07/12-15/2015. Tianjin, China. International Scientific Committee Advisory, reviewer. 10/2015-07/2015

13th International Conference on Indoor Air Quality and Climate 2014. Hong Kong. International Scientific Committee Advisory, reviewer, Chair. 5/2013-08/2014

After 3.11: New Architecture + Engineering. Berkeley, US. Panelist. 2-3/2014

International Conference Counting the Cost of Comfort in a Changing World 2014. Windsor, UK. International Scientific Committee Advisory, reviewer. 8/2013-05/2014

International Conference RoomVent 2014. San Paulo, Brazil. International Scientific Committee Advisory, reviewer. 8/2013-10/2014

ASHRAE Indoor Air Quality 2013. Environmental health in low energy buildings. Vancouver, British Columbia, Canada. Reviewer. 5-10/2013

International Conference CLIMA 2013, Prague, Czech Republic. Section chair, reviewer. 8/2012-06/2013

2nd International Conference on Building Energy and Environment 2012, Boulder, Colorado, US. International Scientific Committee Advisory. 9/2011-08/2012

12th International Conference on Indoor Air Quality and Climate 2011, Austin, Texas, US. Conference attendance, oral presentation. 06/2011

IAQVEC 2010, Syracuse, New York, US. Chair, reviewer, oral presentation. 01-08/2010

SimBuild 2010 Building Simulation, New York, US. Reviewer. 01-08/2010

29th International AIVC Conference (Advanced building ventilation and environmental technology for addressing climate change issues), Kyoto, Japan. Poster presentation. 10/2008

11th International Conference on Indoor Air Quality and Climate, Copenhagen, Denmark. www.indoorair2008.org. Conference attendance, oral presentation. 08/2008

46th International Conference AICARR-Expocomfort, Milan, Italy. Conference attendance, oral presentation. 03/2008

10th International Conference on Air Distribution in Rooms, Roomvent 2007, Helsinki, Finland. Conference attendance, oral presentation. 06/2007

Peer Reviewer *(chronological order with date of first review in parenthesis)*
Building Simulations (01/25). Rapid Reviews: COVID-19 (09/20). Nature Energy (04/17). Building Research & Information (08/14). Indoor and Built Environment (06/14). Indoor Air (12/12). Advances in Building Energy Research (11/12). Architectural Science Review (09/2011). Energy and Buildings (02/10). HVAC&R Research (08/09). Environmental Engineering Proceedings (06/09). Building and Environment (06/09). ASHRAE Journal (03/09); ASHRAE Transactions (03/09)

Professional activities

Association - role	***Begin***	***End***
Member of the Editorial Board of the journal of Building Simulations	01/2025	ongoing
I was offered to become an Editor of Building and Environment, but I declined.	11/2024	11/2024
Performed best paper reviews for Building and Environment	10/2023	ongoing
Extreme Heat Work Group Member – Code Change Proposals. International Code Council.	08/2023	12/2023
Grants reviewer for the Kuwait Foundation for the Advancement of Sciences (KFAS)	06/2023	ongoing
I was offered to be in the Editorial Board of the International Journal of Ventilation, but I declined	06/2023	06/2023
ASHRAE Project Committee SPC 241, Standard to Address Mitigation of Airborne Infection Transmission. Non-voting member.	01/2023	05/2024
Technical Advisory Group (TAG) member for the World Health Organization (Department of Environment, Climate Change, and Health), World Meteorological Organization and the Global Heat Health Information Network on "Informing decision-making about indoor heat risks to human health". 24 months.	08/2022	08/2024
I was offered to be in the Editorial Board of Buildings & Cities, but I declined	11/2021	11/2021
US TAG ISO/TC 163. Non-Voting Member	01/2023	ongoing
US TAG ISO/TC 163. Voting Member	09/2021	12/2022

I was offered to be in the Editorial Board of Buildings, but I declined.	04/2021	04/2021
I was offered to be in the Editorial Board of Scientific Reports (part of Nature Portfolio of journals), but I declined.	04/2021	04/2021
I was offered to be in the Editorial Board of Technology | Architecture + Design [TAD] but I declined.	2/2021	2/2021
I was offered to become an Editor of Building and Environment, but I declined.	11/2020	11/2020
Member of the Editorial Board of the journal of Building and Environment	11/2020	ongoing
Member of the Environmental Health Advisors Board at View	12/2019	10/2023
Member of the Editorial Board of the journal of Energy and Buildings	10/2019	ongoing
Grants reviewer for UNC Charlotte.	03/2019	04/2019
Grants reviewer for the Office of Research Administration at New York University Abu Dhabi	03/2018	03/2019
Advisor for the International WELL Building Institute - WELL Air & Thermal Comfort	06/2018	ongoing
Reviewer for WELL v2 standard	03/2018	05/2018
Member of the Editorial Board of the journal of Advances in Building Energy Research (Taylor & Francis)	02/2018	ongoing
Grants reviewer for the Research Grants Council (RGC) of Hong Kong	03/2015	ongoing
ASHRAE TC 6.5 Radiant Heating and Cooling– non voting member.	01/2015	ongoing
U.S. Green Building Council LEED Technical Advisory Group on Indoor Environmental Quality. Voting member	07/2014	07/2015
ASHRAE SPC 216 Methods of test for determining application data of overhead circulator fans. Voting member. We develop a standard from zero. The new standard was published in 2020.	03/2014	01/2021
Reviewer of the book: “Behind the green door: A critical look at sustainable architecture through 600 objects” by Rotor.	03/2014	03/2014
Alembic Goods. Advisory Board member	07/2013	01/2019
Cariplo Foundation (one of the European largest grant-making foundation). Advisor Board for the peer-reviewing of research projects www.fondazionecariplo.it	05/2013	05/2015
Offered Vice-Chair ASHRAE TC 2.1 “Physiology and Human Environment”.	01/2013	01/2013
ASHRAE TRG7 Underfloor Air Distribution (UFAD) - corresponding Member. http://trg79-ufad.ashraetcs.org/	01/2011	01/2013
ASHRAE SSPC 55 Thermal environment conditions for human occupancy– non voting member.	06/2011	ongoing

ASHRAE TC 2.1 Physiology and human environment – corresponding member. http://tc21.ashraetcs.org/	01/2011	ongoing

Professional Memberships

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Associate 2008-18; Member since 2018
ISIAQ: International Society of Indoor Air Quality and Climate. Member. Member since 2020
IBPSA US: International Building Performance Simulation Association – US chapter, since 2009-2017
SBSE: Society of Building Science Educators, since 2011-13
IBPSA IT: International Building Performance Simulation Association – IT chapter, 2011-13
AICARR: Associazione Italiana Condizionamento dell'Aria Riscaldamento Refrigerazione, 2005-11
BTES: Building Technology Educators Society, 2011-14

Honors and Awards

Date	Honors and awards received by me for research achievements
01/ 2025	2024 Best Paper Awards given by Building and Environment. Building and Environment journal received more than 8300 submissions in 2024, out of which only the 15% were published, and only five were selected for the award (better than 99.94 percentile of the submitted paper and 99.6 percentile of accepted paper), which is given in recognition of the papers' originality, contributions to the field, quality of presentation, and soundness of the science. Paper: Sun et al (2024).
11/ 2021	2021 WELL community award by International WELL Building Institute for my WELL Advisor work to transform buildings, organizations and communities around the world to prioritize health, in the aspect concerning thermal comfort.
1/ 2019	Three out of three 2018 Best Paper Awards given by Building and Environment. Building and Environment journal received more than 3000 submissions in 2018, out of which 640 were published, and only three were selected for the award, which is given in recognition of the papers' originality, contributions to the field, quality of presentation, and soundness of the science. For the three papers see reference above. Kim et al (2018); Földváry et al (2018) and Jin et al (2018).
12/ 2018	Best paper award at PLEA 2018. 34th International Conference on Passive and Low Energy Architecture, 10-12 Dec 2018, Hong Kong for the paper: "Karmann C, Schiavon S, Graham LT, Raftery P, Bauman F. 2018. Occupant satisfaction in 60 radiant and all-air buildings: Comparing thermal comfort and acoustical quality."
09/ 2017	Faculty Award for Excellence in Postdoctoral Mentoring given by The Berkeley Postdoctoral Association. "This award shows that you are going above and beyond your academic responsibilities by fostering your postdocs' professional and scientific development. We received great nominations this year and it was extremely challenging to decide… your nomination stood out and you deserved to win."
02/ 2013	Ralph G. Nevins Physiology and Human Environment Award 2013 by the American Society of Heating, Refrigeration and Air Conditioning Engineers (www.ashrae.org). The Ralph G. Nevins Physiology and Human Environment Award is given once each year to a young researcher who has distinguished himself in human's response to the environment, which may include thermal, moisture, visual, acoustical, toxic, allergic, olfactory, vibrational, and microbiological effects on man's health, comfort, and well-being.
06/ 2010	REHVA young scientist award. The award is given for outstanding research work of a young researchers (less than 35 years old) on subjects covered by the fields of the European Federation of Heating Ventilation and Air Conditioning Associations (REHVA) competence. REHVA represent more than 100 000 engineers from 28 European countries.

10/ 2008 Best poster award at the 29th International AIVC Conference (Advanced building ventilation and environmental technology for addressing climate change issues), Kyoto, Japan.

Lectures and keynotes

91. "Project HEATS: Heat exposure, Activity, and Sleep". CREATE Seminar: Human Health and Personalized Medicine. 06/25/2025
90. "Cooling people with air movement". United Nations Environment Program Passive Cooling WG. 04/03/2025
89. "Cooling people with air movement". Mindanao State University. 04/22/2025
88. "Personal comfort models". Georgia Tech PhD seminar. 02/26/2025.
87. Keynote lecture. "Personal comfort models". First International Symposium on Carbon-Neutral Architectural Technology. Seoul, South Korea. 01/16-17/2025
86. "Personal comfort models". International Workshop on Building Energy Efficiency and Indoor Environmental Quality in AI Era at Hong Kong Polytechnic University, Hong Kong. 01/9-10/2025.
85. "Cooling people with air movement". Global Heat Health Information Network Southeast Asia Heat Health Forum 2025. Singapore, 01/ 7-10/2025.
84. "Hybrid cooling". Building Construction Autority of Singapore. 10/16/2024
83. "Energy saving and thermal comfort in a zero-energy office building with fans in Singapore". PG&E Seminar. 12/12/2023
82. "The future of cooling". Invited lecture at the Oxford Energy Society, University of Oxford, UK. 11/09/2023
81. "Hybrid Cooling: An Overview". CREATE webinar series. 06/26/2023. Singapore https://youtu.be/O_fqImxrjF0
80. Keynote lecture. "Personal comfort models". IAQVEC 2023 Tokyo, Japan. 5/20-23/2023
79. "The future of cooling". International Building Energy Efficiency Symposium. Karachi, Pakistan, 05/12-13, 2023.
78. "Healthy Buildings: Thermal Comfort Monitoring". California Labor Lab's conference: "Surveillance, Monitoring, and Data Gathering in Contemporary Employment." 05/2-3, 2023.
77. "The future of cooling". Frontiers of Energy Management and Technology Innovation. 3/31/2023. Pisa, Italy.
76. Distinguished Lecture in UNL Durham School Seminar Series. "The future of cooling". University of Nebraska-Lincoln. 02/17/2023
75. "The future of cooling". Guest lecture at Yonsei University, South Korea. 12/7/2022.
74. Keynote lecture. "Providing thermal comfort with air movement". Roomvent 2022. Xian, China. 10/16-19/2022
73. Keynote lecture. "Cooling people with air movement, a sustainable and affordable alternative to AC". CATE22. Edinburgh, UK. 10/5-6/2022
72 "Applying Thermal Comfort Concepts for Low-Energy Building Solutions". PG&E education. AIA Course Number NWB20220707. 08/18/2022
71. University of Toronto Dept of Civil & Mineral Engineering Distinguished Lecture Speaker. "The future of cooling". 11/17/2021
70. Keynote lecture. "How to Improve Well-being and Reduce the Environmental Impact of Buildings". C3.ai DTI Digital Transformation of the Built Environment. 10/26-28/2021
69. "Effect of Carbon Dioxide on Occupant Cognitive Performance and Physiological Parameters" NASA IEQ committee. 04/07/2021
68. "Future cooling, less AC and more air movement". Past, Present and Future of Binnenmilieu. 03/18/2020
67. "How to design and operate buildings to be resilient to pandemics". Ministry of National Development (MND) of Singapore webinar on: "Beyond COVID19: Rethinking Planning/ Design/ Construction/ Maintenance". 08/19/2020

66. "The future of cooling". CREATE Symposium on Climate Change. Singapore. 12/6/2019
65. "Move the air, don't cool it - Electric fans as alternative or augmentation to air conditioning for mitigation and adaptation to climate change". ICPA 2019. The 14th International Congress of Physiological Anthropology. Singapore. 10/24-27/2019
64. "First move the air, then cool it". International Built Environment Week at BCA Academy. Singapore. 09/02/2019
63. "Elevated air speed overview". SinBerBEST symposium. Singapore. 08/05/2019
62. "The accuracy of the PMV/PPD model and on what to do in simulations". IBPSA-USA SFBA chapter. San Francisco, US. 5/28/2019
61. Keynote lecture. "The Future of Thermal Comfort in a Warming Climate". SimAUD 2019. Atlanta, US. 04/8/2019
60. "Personalized Comfort Modeling for Occupant-centric Environmental Control". Presentation at the 2019 ASHRAE Winter Conference. Atlanta, US. 1/13/2019
59. "Energy efficient building technologies". CED Executive Education program "Thinking outside the walls: innovative strategies for affordable & sustainable housing". Berkeley, CA 03/23/2018.
58. "Personal thermal comfort models based on physiological parameters measured by wearable sensors". Windsor Conference, Windsor, UK. 04/12-15/2018.
57. "Personalize Comfort: Incorporating Real-time Thermal Comfort and Indoor Occupancy into Building Management Systems". Siebel Energy Institute Workshop "Digital Transformation: Smart Energy Systems and Beyond" in Turin, Italy. 2/15/2018
56. "Center for the Built Environment Overview". DIVA Day. Berkeley, CA. 10/28/2017
55. "Personalized comfort". Atelier Ten. San Francisco, CA. 7/25/2018
54. "Increased air movement for thermal comfort and energy savings" WOHA, Singapore. 06/27/2017
53. "Quantified-self thermal comfort". Quantified Self Show&Tell. Berkeley, CA. 1/26/2017
52. "Building energy simulations" Energy policy and simulation in Northern California and Japan. Berkeley, CA. 11/10/2016
51. "Cooling load for radiant systems" IBPSA SF. Berkeley, CA. 10/26/2016
50. "Personalized comfort" MIT Building Technology Lecture Series. Massachusetts Institute of Technology. Cambridge, MA. 10/17/2016.
49. "Real-time personal continuous monitoring of air temperature, relative humidity, carbon dioxide, and thermal and perceived air quality acceptability in Singapore" and "Dynamic clothing model". Windsor Conference, Windsor, UK. 04/7-10/2016
48. "Annex 69 Subtask A: Collecting field data and modeling occupant adaptation". Presented for Ed Arens. University College of London. Annex 69 Workshop "Strategy and practice of adaptive thermal comfort in low energy buildings". London, UK. 04/06/2016
47. "CBE research program overview". Presentation at Nottingham University, Department of Architecture and Build Environment. Nottingham, UK. 04/05/2016.
46. "Thermal comfort and indoor air quality: CBE and SinBerBEST perspectives". Lecture at University of Padua. Padua, Italy. 03/30/2016.
45. "CBE research program overview". Presentation at Lawrence Berkeley National Laboratory. Berkeley, California. 03/15/2016
44. "Healthy Buildings". Lecture at University of Oregon, Department of Architecture, Arch 491/591 ECS, Professor Alison Kwok. Eugene, Oregon. 03/01/2016.
43. "Indoor Environmental Quality and Cognitive Performance when Personally Controlled Air Movement is Used by Tropically Acclimatized Persons" and "Energy assessment of SinBerBEST Technologies: Final results". SinBerBEST Annual Meeting. Singapore. 01/12-13/2016
42. "Whole building energy modeling of SinBerBEST technologies: Baseline model and examples of energy saving solutions" SinBerBEST review. Singapore. 08/03/2015

41. “A classification scheme for radiant systems based on thermal time constant”, “Effect of air temperature and personally controlled air movement on thermal comfort for tropically acclimatized persons”, “Do radiant systems provide better thermal comfort than all-air systems? A short critical literature review” International Conference COBEE 2015. Tianjin, China. 07/12-15/2015
40. “Dynamic clothing model & CBE Thermal Comfort Tool” COBEE 2015 Workshop. Tianjin, China. 07/14/2015
39. “Cooling load differences between radiant and air systems” COBEE 2015 Workshop. Tianjin, China. 07/15/2015
38. “Indoor environmental quality and energy efficiency. Technical University of Crete. Chania, Greece. 06/18/2015
37. “Building occupant satisfaction in office buildings”. NIOSH 1st International Symposium to Advance Total Worker Health, Bethesda, US. 09/7/2014
36. “Indoor environmental quality and energy efficiency: How to achieve both.” Workshop of Building Efficiency (Peder Sather Center Grant). Berkeley, US. 9/15/2014
35. “Stratification prediction model for perimeter zone UFAD diffusers based on laboratory testing with solar simulator”, “A comparison between two underfloor air distribution (UFAD) design”, and “Sensation of draft at ankles for displacement ventilation and underfloor air distribution systems”. International Conference Indoor Air 2014, Hong Kong. 07/8-11/2014
34. “Underfloor air distribution: An overview”. International Conference Indoor Air 2014, Hong Kong. July 8.
33. “UFAD Cooling Load Design Tool”. Stefano Schiavon. ASHRAE Winter meeting. New York. 01/21/2014.
32. “Unveiling the Built Environment: Energy Efficiency and Indoor Environmental Quality”. SinBerBEST Annual Meeting. Singapore. 01/08/2014
31. “Occupant satisfaction and indoor environmental quality: What matters, LEED rating, and clothing behavior”. CERC-BEE Forum on Human Behavior and Integrated Design for High Performance Buildings, LBNL, Berkeley. 07/18/2013
29. “Temperature Stratification in a High Cooling Load Office with a Combined Chilled Ceiling and Displacement Ventilation System”. 11th International Conference CLIMA 2013, Prague, Czech Republic. 06/17/2013
28. “Thermal comfort and air change effectiveness in a combined chilled ceiling and displacement ventilation system”. With Fred Bauman and Julian Rimmer. Golden Gate ASHRAE, Oakland, CA. 02/21/2013.
26. “Design Zone Cooling Loads for Radiant Systems”. Fred S. Bauman, Jingjuan Feng and Stefano Schiavon. ASHRAE Winter meeting. Dallas, TX. 01/28/2013.
25. “Climate analysis for sustainable building design”. MUD course. Berkeley, US. 10/26/2012
24. “Introduction to the use of citations and RefWorks”. Brown Bag Lunch, Berkeley, US. 09/04/2012
23. “Room Air Stratification and Ventilation Performance in Combined Chilled Ceiling and Thermal Displacement Ventilation Systems”. ASHRAE Annual meeting, San Antonio, US. 06/04/2012
21. “UFAD cooling load design calculations”. Optimizing energy and comfort performance of Underfloor Air Distribution Systems: Guidelines, tools, and lessons from a decade of research and practice. PG&E Pacific Energy Center, San Francisco, US. 04/18/2012
20. “Predictive clothing insulation model based on outdoor air and indoor operative temperatures”. 7th Windsor Conference: The changing context of comfort in an unpredictable world Cumberland Lodge, Windsor, UK. 04/14/2012
19. “Underfloor air distribution and personal environmental control systems”. LoCal meeting. Berkeley, US. 09/30/2011.
18. “Ventilation effectiveness in combined chilled ceiling and displacement ventilation systems”. Indoor Air conference 2011, Austin, US. 06/05/2011.

17. "UFAD cooling airflow design tool", MIT, US. 02/10/2011.
16. "UFAD overview and cooling airflow design tool" and "Unveiling the built environment", Graduate School of Design, Harvard University, US. 02/8-9/2011.
15. "Wireless cart for the performance Measurement Protocol". Emerging Technologies Conference, section "Best Practices in the Emerging Technologies Field Testing". Sacramento, US. 11/8/2010.
14. "Room air stratification in combined chilled ceiling and displacement ventilation systems". IAQVEC conference, Syracuse, US. 08/17/2010.
13. "Energy analysis of personalized ventilation system". IAQVEC post conference workshop, Ottawa, Canada. 08/19/2010.
12. "UFAD cooling airflow design tool". CBE meeting. Berkeley, US. 04/22/2010.
11. "Energy analysis of a personalized ventilation system in a cold climate: influence of the supplied air temperature". The 29th International AIVC 2008 Conference Kyoto, Japan.
7. "Energy saving and improved comfort by increased air movement". 11th International Conference on Indoor Air Quality and Climate. Indoor Air 2008. Copenhagen, Denmark.
6. "Energy savings strategies of personalized ventilation" at 3rd workshop on PECS, EXHAUSTO. Denmark. 08/15/2008.
5. " Indoor Climate and Productivity in office buildings" at the 46th International Conference AICARR-Expocomfort, Milan, Italy. 03/12/2008.
4. "Saving energy with increased air velocity" 3-03/04/2008. Lyngby, ICIEE, DTU, Denmark. DTU-IBP-TU Muchen-Fraunhofer PhD student meeting.
3. "Saving energy with personalized microenvironment (PEM)" about "Saving energy with increased air movement" Lyngby, ICIEE, DTU, Denmark. The workshop was organized by TNO and ICIEE. 10/9-10/2007.
2. "Design of Displacement Ventilation System and experimental Results" at the workshop on Advanced HVAC systems. Padua, Italy. 09/28/2007.
1. "An Index for Evaluation of Air Quality Improvement in Rooms with Personalized Ventilation Based on Occupied Density and Normalized Concentration" at the International Conference on Air Distribution in Rooms, Roomvent 2007. Helsinki, Finland, 06/13-15/2007.

Language skills

Italian: Mother tongue
English: Proficient
Spanish: Independent
Chinese: Intermediate. I obtain the first level certification of Chinese language from Beijing Language and Culture University (北京语言大学) Beijing, China (20 hours per week for six months). I lived and studied at Tsinghua University (清华大学) for a year. Since mid 2019 I restarted studying Chinese and I reached HSK 3 in June 2022 (~1500 words).

Computer skills and competences

Energy analysis of building: EnergyPlus and several interfaces (e.g. DesignBuilder); IDA-ICE. Computer Fluid Dynamics: Flovent; AirPak. Solar analysis and shading: CBE Clima Tool. Automation and measurement: LabView. Heat transfer: Windows; Comfen; Heat 2 and 3; Therm. Multizone airflow: Contam. Refrigeration: CoolPack. Statistics: R-statistic (advanced user); RStudio. Optimization: GenOpt. CAD: AutoCAD; Rhino. GitHub.

University Service

Campus/Senate

25-26 UC Berkeley Faculty Leadership Academy Fall 2025. Since its inception in 2018, I am the first from the Department of Architecture. I enhanced my leadership skills and knowledge of UC Berkeley. Key topics: self-awareness, communication,

analytical skills, fostering cross-campus connections, and increasing confidence for leadership roles. The program requires 130 hr of work over the Fall Semester.

25-now	Associate Director of Research at the Center for the Built Environment.
21-24	Digital Transformation Institute reviewer of applications
20-now	Member of the Academic Senate's Faculty Awards Committee (FAC).
18-now	Associate Director, Center for Environmental Design Research. Duties: 1) help strengthen CEDR intellectual identity and mission statement, 2) expand CEDR cross-campus interdisciplinary collaborations, and 3) find closer connections to UCB's new Signature Initiatives
17-18	Chancellor's Advisory Committee on Sustainability (CACS). Member
17-now	Global Metropolitan Studies Affiliate
16-now	Energy and Resources Group Affiliate
15-16	Siebel Energy Institute Scholar program. Reviewer of applications
14-15	Steering Committee of the campus Energy Initiative. Member
14-now	Advisory Board of Certification Program in HVAC for UC Berkeley Extension. Member
12-13	Steering Committee of the campus Energy Initiative. Member
11-12	Steering Committee of the campus Energy Initiative. Member

College and Department

2024-25	MS/PhD BSTS Director. Managed admissions. Coordinate teaching offering.
2024-2025	CHF Fellowship review committee member.
2023-24	MS/PhD BSTS Director. Updated website. Managed admissions. Coordinate teaching offering.
2022-23	MS/PhD BSTS Director. Updated website. Managed admissions. Coordinate teaching offering. Lead the Academic Program Review. Restructuring and updating handbooks.
2021-22	Ad-hoc committee member for adjunct promotion case in CEE.
2021-22	Performed teaching review of two lecturers.
2021-22	MS/PhD BSTS Director. Updated website. Managed admissions. Coordinate teaching offering. Developed and organized three modules class for Spring 2022. Supported the Academic Program Review
2020-21	Architecture department representative to the Sustainable Environmental Design major. SED is the second largest undergraduate major in the College
2020-21	MS/PhD committee. Member
2018-19	Chair of the search committee on Architectural Design for Sustainable Building Performance (Search #2311, 1.00 FTE, NT)
2018-19	Member of the MArch Academic Program Review
2018-19	Member of the PhD Academic Program Review
2017-18	Department Ad-Hoc Committee Report on tenure case. Member
2017-18	MS/PhD committee. Building Science and Technology Area Coordinator
2015-17	MS/PhD committee. Member
2015-16	MS/PhD committee. Member (Lead the introduction of Plan 2 – report option in MS program)
2015-16	MS/PhD committee. Member (Lead the change of language requirements)
2014-15	MS/PhD committee. Member
2013-14	MS/PhD committee. Member

2013-14	Search committee member of the Structure and Emerging Building Technology Search #1619. Member
2012-13	CED Strategic Planning Committee Task Force on the Future of Ecologies.
2012-13	Development and implementation of energy efficiency measure regarding ventilation rate in Wurster Hall. Roughly 30 hours used to meet the building manager and campus energy service engineer to design, implement and monitor demand control ventilation.
2012-13	MArch admissions committee. Member
2012-13	Undergraduate committee. Member. Curriculum development and student funding
2012-13	MS/PhD committee. Member.
2011-12	MArch admissions. Member
2011-12	MS/PhD committee. Auditing.

Reviews of student work

32. 12/17/20. Forrest Meggers. PhD seminar review. Princeton University. 9-10am
31. 11/30/20. Eric Cesal. ED 110. Final debate. 9.30-11am
30. 11/19/20. Mark Anderson. March thesis review. 6-7.30pm
29. 4/22/19. Marsha Maytum, Bill Leddy. Studio review. 4-6pm
28. 12/4/18. Eric Cesal. Arch 100C. Final review. 4-5pm
27. 11/28/18. A249 Simon Schleicher. Final presentation. 11am-12pm
26. 11/15/18. MArch thesis prep presentations. 1-2pm.
25. 02/13/17. Simon Schleicher. Studio One. 4-5.30pm.
24. 11/14/16. Danelle Guthrie. A203. Mech system review. 5-6pm
23. 11/02/16. René Davids. 100C. Mech system review. 5-6pm
22. 05/08/15. Kyle Steinfeld. Studio One. Final Review. 10am-12pm
21. 05/05/15. Jean Paul Bourdier A100B. Final Review. 2-4pm
20. 12/11/14. René Davids. Integrated Design Studio. Final Review. 5-7pm
19. 09/24/14. Chris Calott. Integrated Design Studio. HVAC systems review 2-4pm
18. 05/06/14. Jean Paul Bourdier A100B. Final Review. 1-4pm
17. 05/02/14. Susan Ubbelohde A245 Daylighting. 4-5.30pm
16. 05/13/13. Steinfeld and Levitt. A229. Building performance vis. Final review. 6-9pm
15. 05/11/13. Paz Gutierrez. Final thesis review. 2-5pm
14. 05/06/13. Roddy Creedon. A100b. Final Review. 3-6pm
13. 04/08/13. Renee Chow. Vertical Cities Asia Studio. Mid-review. 2-4pm
12. 03/13/13. Midterm thesis review. 5-7pm
11. 03/11/13. Midterm thesis review. 4-6pm
10. 11/18/12. Mark Anderson, René Davids, Paz Gutierrez Studio. Review. 3-5pm
9. 10/31/12. Mark Anderson, René Davids, Paz Gutierrez Studio. Review. 3-6pm
8. 05/04/12. Nicholas de Monchaux StudioOne. Final review. 2-6pm
7. 12/08/11. Nicholas de Monchaux StudioOne. Final first semester review. 1-6pm
6. 11/17/11. Raveevarn Choksombatchai Master thesis. Midterm review. 5-8pm
5. 10/31/11. Nicholas de Monchaux StudioOne Final first part review. 2-5pm
4. 10/12/11. Susan Ubbelohde ED 105 Deep Green Design. 9.30-11am

3. 10/10/11. Jean Paul Bourdier Studio 101. Final review. 2-5pm
2. 09/26/11. Jean Paul Bourdier Studio 101. Mid-term review. 2-6pm
1. 09/21/11. Nicholas de Monchaux StudioOne. Mid-term review. 2-6pm

Other Service

29. 10/11/24. E93 Energy Engineering Seminar lecture E
28. 1/31/22. Arch 100D review of passive solar strategies
27. 10/08/21. E93 Energy Engineering Seminar guest lecture
26. 9/13/21. MAAD studio guest lecture
25. 1/28/21. Arch 249 guest lecture
24. 1/14-15/21. 5-hour anti-racist models of architectural education workshop
23. 12/14/20. Arch admissions - Implicit Bias Workshop for STEM
22. 11/20/20. Navigating Unconscious Bias workshop by Unconscious Bias Project
21. 04/26/18. Arch 240 guest lecture
20. 08/16/17. Introduction to newly admitted students
19. 04/13/17. Arch 240 guest lecture
18. 04/05/17. ED4C guest lecture
17. 03/06/17. Arch 207B I guest lecture
16. 02/23/17. Judge for BERC Innovation Expo
15. 10/06/16. Arch 110 guest lecture
14. 08/22/16. Introduction to newly admitted students
13. 04/27/16. Arch 240 guest lecture
12. 02/23/16. Arch 298 guest lecture
11. 05/01/16. Arch 240 guest lecture
10. 03/09/15. Arch 207B guest lecture
9. 03/02/15. Arch 298 MS PhD lecture
8. 08/26/14. Introduction to newly admitted students
7. 04/12/14. Cal Day meeting with incoming students
6. 03/13/14. Co-chair of panel of student presentations at Berkeley Circus 2014
5. 04/21/13. Cal Day meeting with incoming students
4. 04/08/13. Introduction to newly admitted students
3. 08/21/12. Introduction to undergraduate students
2. 08/22/12. PhD/MS orientation
1. 03/1-2/12. CED Berkeley Circus. Project reviewer